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OCTOBER

THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

1924

Focal Infection—*Rosenow*

Esthetics—*Crawford*

Oral Prophylaxis and Periodontia —*McCall*

Responsibility to Edentulous Patient —*Gillis*

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EDITORIAL

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THE JOURNAL
OF THE
American Dental Association
VOL. 11 OCTOBER, 1924 NO. 10

Original Communications

EXPERIMENTAL AND CLINICAL STUDIES ON FOCAL INFECTION AND ELECTIVE LOCALIZATION: NEWER FINDINGS AND THEIR SIGNIFICANCE*

By EDWARD C. ROSENOW, M.D., Rochester, Minnesota

(Read at the formal opening of the Deaner Institute, Kansas City, Missouri, May 23, 1924, and at the Northern Ohio Dental Association, June 2, 1924)

FOR many years, it has been recognized that localized injury to the surface of the body, such as the prick of a pin or needle, is likely to be followed by serious systemic manifestations, ascending streptococcal lymphangitis, suppurative adenitis and even death. For generations, keen clinical observers have emphasized the importance of the occurrence of rheumatic fever following rheumatic sore throat, and of mono-articular arthritis and other diseases following tonsillitis, and even following acute infections around the teeth. But the possibility that a similar causal relationship commonly exists between metastatic disease and localized infections in such areas as tonsils and teeth that are symptomless is a relatively new idea, and is an outstanding contribution of Billings[1] and his associates to scientific medicine. The progress in this work was due largely to careful clinical observation, which made it clear that the areas presenting localized but symptom-

*From the Division of Experimental Bacteriology, The Mayo Foundation.

1. Billings, Frank: Chronic Focal Infections and Their Etiologic Relations to Arthritis and Nephritis, Arch. Int. Med., 9:484-498, 1912: Focal Infection: Its Broader Application in the Etiology of General Disease, J. A. M. A., 63:899-903, 1914.

less infections are common portals of entry for the micro-organisms that produce systemic disease, correlated with experimental tests in animals, which demonstrated that these areas afforded not only entrance but also a favorable environment for the organisms to acquire particular invasive powers. Through these experiments, and a series of earlier observations on the effect of successive animal passage on the localizing power of members of the pneumococcus-streptococcus group of organisms so constantly present in these areas, in which marked changes in localization were noted, the

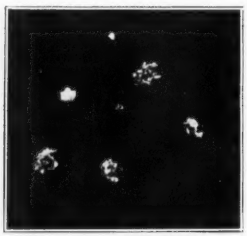

Fig. 1.—Rough, angular, mulberry-like calculi from the pelvis of a kidney of a dog, three months after devitalization and infection of teeth with a culture from the urine of a patient with nephrolithiasis.

idea of selective action or elective localization had its birth. When, as laboratory strains were successively passed through animals, ulcer of the stomach developed, an example of unusual localization, this conception took definite form.

Experimental Studies

By the use of special methods, which included the proper selection of cases; a painstaking effort to obtain material from the depths of foci and metastatic lesions; the use of favorable culture mediums, in which the conditions present in foci and metastatic lesions were simulated by affording a gradient of oxygen pressure; the intravenous injection of animals with primary mixed cultures and rapidly made transfers of pure cultures obtained from the focus of infection, and the close observation and examination not only of the animals that died but also of those seemingly well and anesthetized for necropsy, the common causal relationship of organisms from foci of infection and metastatic areas in a series of diseases has been proved. Among these are: subacute bac-

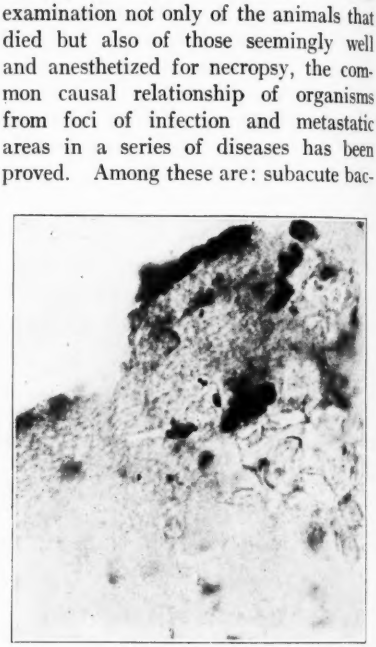

Fig. 2.—Diplococci in the medulla precisely where crystallization of lime salts began; gram stained; × 1,000.

terial endocarditis; rheumatic fever; iritis and other diseases of the eye; appendicitis; ulcer of the stomach in man and domestic animals; cholecystitis and gallstones; pancreatitis, acute and chronic; arthritis and myositis; dental neuritis and myositis; poliomyelitis, herpes zoster; intercostal neuralgia; multiple neuritis and sciatica; epidemic parotitis, erythema nodosum; nephritis, and nephrolithiasis. In some of these diseases, specific localization followed direct intravenous injection of the bacteria obtained from the pus expressed

from infected tonsils or aspirated from the depths of the pyorrheal pockets.[2]

It was not always necessary to give intravenous injections to reproduce in animals the disease from which the patient was suffering. Introduction of the bacteria in suitable dosage into the peritoneal cavity, the trachea, the brain, the stomach or the rectum, or into the nasal cavity by packing the nose with gauze soaked in cultures, was followed by specific localization in special instances. Moreover, by devitalizing and infecting the teeth in dogs, thus closely simulating the conditions often inadvertently induced in patients by dentists, chronic foci were produced. Nephritis, nephrolithiasis (Fig. 1), ulcer of the stomach, spasms of the diaphragm and other muscles, and chorea have been produced in this way with cultures isolated from these respective diseases in man, and in each instance the causal relationship of the organism introduced into the teeth to the metastatic lesion has been established by the demonstration of the organism in the lesions (Fig. 2) and focus (Figs. 3 and 4), and by the elective localizing power of the strains isolated. In Table 1 are summarized the results following intravenous injection of streptococci from appendicitis, ulcer of the stomach, cholecystitis, myositis, acute poliomyelitis and neuritis and sciatica, as well as of streptococci from miscellaneous sources. The high incidence of lesions in the characteristic organ in each of these diseases demonstrates the elective localizing power of

Fig. 3.—Section of a granuloma opposite one of the devitalized and infected teeth, four months after devitalization. The marked variation in the degree of cellular infiltration and the invasion of the surrounding bony structure may be noted; hematoxylin and eosin; × 70.

[2]The original papers giving details of the method and the results obtained may be found in the *Journal of Infectious Diseases* and the *Journal of the American Medical Association* between the years 1909 and 1918.

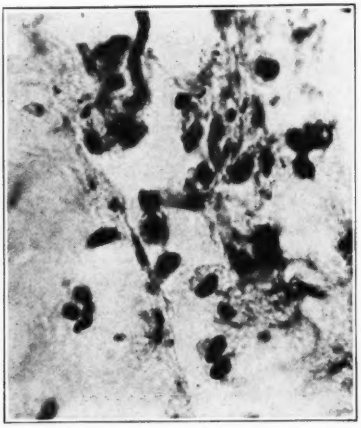

Fig. 4.—Diplococci in the highly cellular portions of the granuloma shown in Figure 3.

the respective strains, which is not apparent with the strains from miscellaneous sources.

The specificity or elective localizing power was often marked, and the range of localization of the various strains in the tissues of animals often corresponded roughly to that noted in the respective spontaneous diseases in man. The specificity of the streptococci from localized infections in the myositis group was so marked that the organism not only tended to localize and produce lesions in muscles, but produced these lesions in approximately the same region as noted in the patient (Fig. 5). When the affection of other structures, such as joints and nerves (Fig. 6), appeared as a secondary factor in the patient's symp-

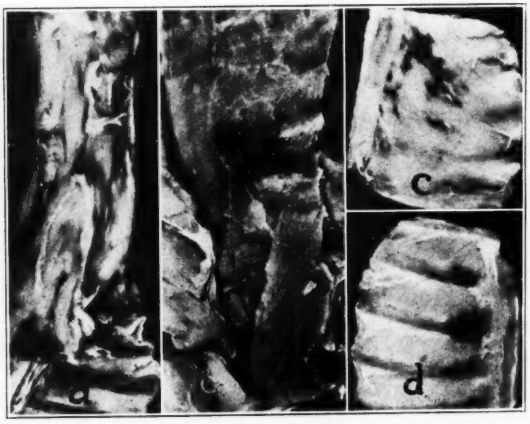

Fig. 5.—*a*, hemorrhagic infiltration of the deep muscles of the neck, often surrounding nerve trunks, of a rabbit injected intravenously with the pus expressed from the tonsils of a patient with acute myositis of the muscles of the neck that followed an attack of tonsillitis; *b*, localized area of hemorrhagic edema and infiltration of the muscles of the lumbar region of rabbit injected with streptococci from the tonsils of a patient with lumbar myositis; *c*, hemorrhagic lesions in the external aspect of the muscles of the upper thorax, especially around the small nerve trunks, in a rabbit injected with streptococci isolated from the mucopurulent discharge from the nose of a patient at the time of an attack of intercostal myositis; *d*, hemorrhagic lesions in the internal intercostal muscles of the thorax in the rabbit referred to in *c*.

toms, lesions were found in these structures also in the injected animals, and the percentage of animals with them was proportionately less than the percentage of animals with muscle lesions. In pregnant rabbits, localization was found to occur in the muscles not only of the parent rabbit, but also of the fetuses.

Localization in the myocardium, especially in the bundle of His, and the concomitant development of arrhythmia of the heart, following the injection of cultures from pyorrheal pockets of a patient with impaired myocardial conduction, is another striking example of the extreme specificity of these strains for certain tissues. The lesions varied from localized abscesses in the muscles to slight edema and infiltration between the muscle fibers (Figs. 7, *a* and *b*). In the former, little difficulty was experienced in demonstrating the organism; in the latter, long search was often necessary (Fig. 8).

Table 1, besides illustrating the specificity of streptococci, illustrates the susceptibility of organs to streptococcal infections. Arthritis, probably the most common disease to which man is heir, occurred more often following injection of nonspecific strains than did lesions in any other structures. Next to arthritis, hemorrhage or ulcer of the stomach and lesions in muscles and endocardium were the most common, corresponding in general to the incidence of lesions of these organs in man.

The importance of the focus as a favorable place for the maintenance of the relatively high and peculiar infecting power of these organisms is shown by the fact that control experiments with cultures from the buccal mucous membrane and surface of the tonsils and throat often proved negative, the animals usually remaining well and entirely or relatively free from lesions, when at the same time the strains from the focus produced characteristic lesions. Moreover, direct experimental proof of this fact has been obtained in the production of chronic foci by the devitalization and infection of teeth in dogs. Strains from arthritis, nephrolithiasis, and ulcer of the stomach, having elective localizing power, often retained this property for many weeks or months in the periapical structures of the teeth so infected.

In this experiment, another important fact was noted, which is in harmony with clinical observations, emphasized

TABLE 1.—ELECTIVE LOCALIZATION FOLLOWING INTRAVENOUS INOCULATION OF STREPTOCOCCI

Source of streptococci	Strains	Animals	Percentage of animals showing lesions in: Muscles	Joints and Ligaments	Nerves	Stomach and Duodenum	Gallbladder	Appendix	Kidneys	Lungs	Skin	Pericardium	Myocardium	Endocardium	Central Nervous System
Appendicitis	17	71	12	29	0	11	1	**70**	0	0	0	0	9	21	?
Ulcer of the stomach	37	168	4	12	0	**68**	21	1	3	0	0	2	3	10	?
Cholecystitis	12	41	7	17	0	29	**80**	0	5	5	2	0	2	10	?
Myositis	28	202	**80**	33	9	13	3	1	9	7	4	4	17	8	?
Acute poliomyelitis	22	123	16	15	4	13	2	2	2	11	0	5	7	7	**46**
Neuritis and sciatica	10	59	42	15	6	5	2	3	12	15	0	5	10	3	14
Miscellaneous	71	212	12	9	4	9	1	1	9	7	4	0	4	12	?

especially by Dunn.[3] The bacteria in the induced chronic focus of infection, besides producing the characteristic disease, appeared to exert general deleterious effects. The animals lost weight and became more susceptible to intercurrent infections, notwithstanding the fact that they were kept under conditions identical with those of control animals. In other words, conditions of hygiene and diet that were adequate to maintain weight and health in normal dogs were inadequate for dogs harboring chronic foci of infection. The harm, therefore, from improper food or hygiene may be greatly exaggerated by bacteria harbored in foci of infection, a point not yet sufficiently considered.

Fig. 6.—*a*, hemorrhagic lesions in the muscles, surrounding the nerve trunks, of the under surface of the scapula and thorax of a rabbit injected with the streptococcus from infected teeth of a man having myalgia, especially of the chest and shoulder muscles; *b*, hemorrhagic lesions in the internal aspect of the muscles of the hind leg along the tendinous partition and adjacent nerve trunk in a rabbit injected with the streptococcus from the tonsils of a neurasthenic young woman during localized myaigic pains of the thorax, and numbness of the right arm.

In my experiments, still other important facts have been brought to light. Streptococci having the same specific localizing power were demonstrated in more than one focus in the same person simultaneously, and in some instances at intervals in one or more foci over a long period. These experimental facts are in harmony with the common clinical observation that persons affected with a particular disease, such as iritis, ulcer or arthritis, are prone to have recurring attacks of the same disease, which often tends to become chronic in character. In the light of these facts, the possibility that the tissues or fluids of the body afford the conditions on which the development of the peculiar localizing power of bacteria depends must be seriously considered. The hereditary tendency observed in some of these diseases also points in this direction, as does the repeatedly made observation that a higher incidence and more marked lesions occur in the characteristic organ or tissues of animals injected with the organisms from foci at the time of acute attacks or during acute exacerbations in chronic affections than occur during quiescent intervals. Moreover, well-marked differences in the incidence and severity of specific lesions were noted at different seasons of the year, especially in chronic ulcer and arthritis. During the colder months, when exacerbations and an increased incidence of these diseases are so common, the incidence of positive results in animals was appreciably higher than during the warmer weather, when patients were relatively or entirely free from symptoms.

Many of the strains of streptococci having specific localizing power were, on isolation, highly sensitive to oxygen pressure, aerobic cultures often remaining negative when partial tension cul-

3. Dunn, A. D.: Mouth Infections, Nebraska, M. J., 2:223, 1917; Dunn, A. D., and Shearer, W. L.: Some Applications of the Principles of Focal Infection with a Method for the Removal of Extensive Disease of the Alveolar Processes, Minnesota Med., 3:241-245, 1920.

tures yielded the specific organism. This point was well brought out in experiments performed in connection with a case of acute iritis. Cultures from the apical end and granuloma of two incisors that had been fractured a number of years before, in glucose broth in columns only 5 cm. tall, and on blood-agar plates, remained sterile; whereas, those in tall tubes of glucose broth yielded a pure culture of a strictly anaerobic streptococcus, which produced marked iritis in a series of animals. The emulsified tissues of the inflamed iris yielded a pure culture of the organism injected, and with it the disease was again produced on intravenous injection; while all cultures from the turbid fluid in the anterior chamber remained sterile. Sections of the granuloma contained the organism. The patient had had recurring attacks, but recovery after removal of the teeth was prompt and the attacks did not recur over a period of five years. In other instances, when the primary aerobic cultures remained sterile, aerobic cultivation was possible in the second culture generation after growth in partial tension cultures, which began at the bottom, had extended to the top.

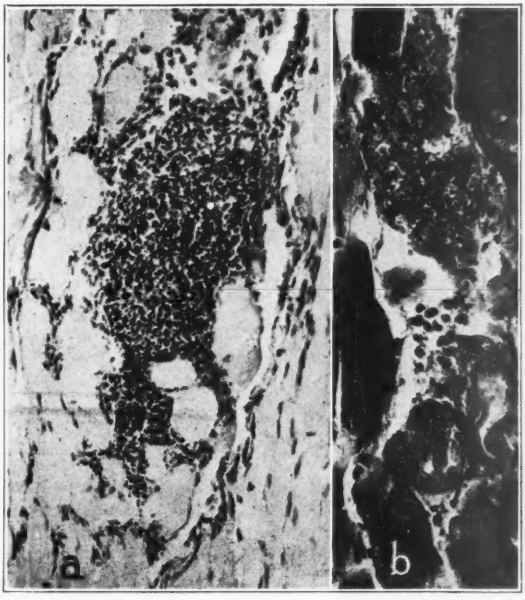

Fig. 7.—*a*, section of a whitish lesion in the muscle of rabbit injected with a streptococcus from a case of marked chronic myositis (hematoxylin and eosin; × 100); *b*, slight leukocytic infiltration and edema between the muscle fibers of the myocardium of a rabbit injected with a streptococcus from the tonsils after one animal passage, in a case of myositis and myocarditis (hematoxylin and eosin; × 200).

Aerobic cultivation tended to destroy specificity promptly, while rapid transfers (from four to six or eight times a day) in mediums such as glucose-brain broth, which afforded a gradient of oxy-

gen tension, and preservation in latent life, tended to preserve this property, sometimes through many generations and over long periods. To illustrate, several strains of streptococci isolated from ulcer of the stomach of man and of sheep, that produced ulcer on intravenous injection, were subcultured aerobically on blood agar for six days, when they had lost the power to produce ulcer. The original shake culture in tall tubes of ascites-glucose agar was layered with paraffin oil and kept at room temperature in the dark for eight and one-half and seven and one-half years, respectively. Subcultures in glucose-brain broth produced ulcer, although milder in character than on isolation, on intravenous injection in a series of animals. Again, aerobic cultivation for only one or two generations sufficed to destroy the power of the streptococcus isolated in epidemic hiccough to produce spasms of the diaphragm; whereas, by rapid transfers in tall tubes of glucose-brain broth, this property was preserved through as many as fifty-three culture generations. The effect of these methods on specificity, as measured by agglutination and precipitation tests, was similar to that of specificity as measured by the intravenous injection of animals, aerobic cultivation causing it to disappear; while rapid transfers in mediums affording a gradient of oxygen tension and preservation in latent life tended to preserve this property. Moreover, agglutination and precipitation experiments with hyperimmune serums showed that in some diseases, the different strains isolated were immunologically alike, while in others they were immunologically different. Thus, most of the strains from ulcer of the stomach of man and of domestic animals were homologous, while those from various forms of arthritis were more heterologous.

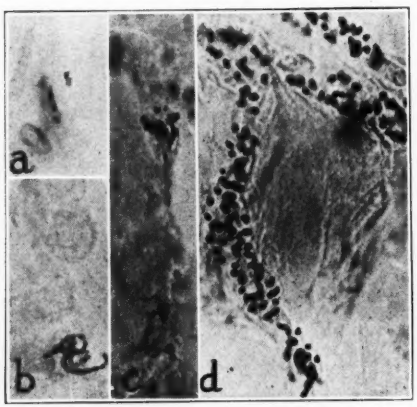

Fig. 8.—*a*, a chain of two diplococci in the lesion in the muscles in a case of rheumatic myositis in man; *b*, chains of streptococci in the area of leukocytic infiltration and excised section of muscle in the forearm of a patient with acute localized myositis; *c*, diplococci in the area of leukocytic infiltration shown in Figure 7*a* and *d*; large number of gram-positive diplococci in the capillaries in the hemorrhagic area in the quadriceps tendon of a rabbit two days after injection with streptococcus from tonsils of a patient with periarthritis and myositis; Gram-Weigert; × 1,000.

The inability of certain of the earlier investigators in this field to corroborate the results of my own experiments would seem to be explainable on the ground of insufficient attention to technical details, as pointed out especially by Gay and Haden, or perhaps of the improper selection of cases and material for study. The early results in ulcer were corroborated by Hardt[4] and Helmholz; in iritis by Irons,[5] Brown and Nadler, and in Cholecystitis by Brown.[6] The results in

4. Hardt, L. L. J.: Contributions to the Physiology of the Stomach. XXXIII, The Secretion of Gastric Juice in Cases of Gastric and Duodenal Ulcer, A. J. Physiol., 40:314-331, 1916.

5. Irons, E. E.: Dental Infections and Systemic Disease; Treatment and Results, J. A. M. A., 67:851-853, 1916.

6. Brown, R. O.: A Study on the Etiology of Cholecystitis and Its Production by the Injection of Streptococci, Arch. Int. Med., 23:185-189, 1919.

ulcer and arthritis have been fully corroborated, extended and controlled in my laboratory by Meisser,[7] with streptococci isolated from infected teeth; by Nakamura[8] with streptococci isolated from extirpated tonsils, and by Giordano[9] with streptococci taken from these foci after death. My methods have been used successfully in a study of the etiology of pyelonephritis and ulcerative cystitis by Meisser and Bumpus;[10] by Moench,[11] in a study of the etiology of endocervicitis, in which she demonstrated that this condition is often due to partial tension streptococci and may be a common portal of entry in arthritis in women; and in a study of the etiology of chronic ulcerative colitis by Bargen.[12] The work on iritis and other diseases of the eye, on ulcer of the stomach and on pyelonephritis, as concerns dental foci especially, has been verified and greatly extended by Haden.[13]

7. Meisser, J. G., and Brock, S.: A Clinical and Experimental Study in Chronic Arthritis, J. A. D. A., 10:1100-1110 (Dec.) 1923.

8. Nakamura, T.: A Study on Focal Infection and Elective Localization in Ulcer of the Stomach and in Arthritis, Ann. Surg., 79: 29-43, 1924.

9. Giordano, A. S., and Barnes, A. R.: Bacteria Recovered Postmortem with Special Reference to Selective Localization and Focal Infection, J. Indiana M. A., 15:1-7 (Jan.), 1922.

10. Meisser, J. G., and Bumpus, H. C., Jr.: Focal Infections in Relation to Submucous Ulcer of the Bladder and to Cystitis, J. Urol., 6:285-298 (Oct.) 1921.

11. Moench, L. M.: Relationship of Chronic Endocervicitis to Focal Infection with Special Reference to Chronic Arthritis, J. Lab. and Clin. Med., 9:289-309 (Feb.) 1924.

12. Bargen, J. A.: Experimental Studies on the Etiology of Chronic Ulcerative Colitis, J. A. M. A., 83:332-336 (Aug. 2) 1924.

13. Haden, R. L.: Elective Localization in the Eye of Bacteria from Infected Teeth. Arch. Int. Med., 32:828-849 (Dec.) 1923; Problems in Focal Infection, M. Clin. N. America, 7:1109-1117 (Jan.) 1924; Haden, R. L., and Jordan, W. H.: Multiple Onychia as a Manifestation of Focal Infection; Experimental Production of Onychia in Rabbits, Arch. Dermat. and Syph., 8:31-36 (July) 1923.

Through strict attention to technical details, he has even succeeded in producing onychia in rabbits with streptococci from foci of infection in patients suffering from multiple onychia, an example of extreme specificity.

More recently, I have put to experimental test the factors of focal infection and specificity of the pneumococcus-streptococcus group in the etiology of various diseases of the nervous system. Intravenous injection of cultures from various foci sometimes resulted in penetration of the meninges, but this did not occur sufficiently often for routine analysis. It was thought that possibly intracerebral inoculation in the silent area far forward in the frontal lobe, of relatively small numbers of organisms found in foci of infection in tonsils, teeth and nasopharynx, might afford opportunity for the growth of strains having peculiar neurotrophic properties, and lead to the destruction of those that did not possess these attributes, just as intraperitoneal injection of mice with sputum serves to separate the virulent pneumococcus from other more markedly saprophytic organisms. This assumption was found to be correct; and, in a series of experiments, various forms of encephalitis, epidemic hiccough, spasmodic torticollis, respiratory arrhythmia following encephalitis, poliomyelitis and acute chorea have been reproduced in animals. Control experiments with material obtained in the same way from these areas in normal persons and in persons suffering from chronic conditions other than of the nervous system, proved negative in nearly all instances. Specificity was manifested by a high mortality rate, by the development of characteristic symptoms and lesions, and by agglutination reactions. The organism has been consistently isolated from emulsions of the brain and filtrates thereof, in patients dead from encephalitis, and in the experimentally induced diseases. It has

been found in the lesions of typical cases of encephalitis, and proved to be absent, remote from lesions and in the brain of persons dead from other causes.

Owing to doubt in the minds of many that streptococci are capable of producing these diseases of the nervous system, the facts in a further series of carefully conducted experiments have been compiled. The close parallelism between the character of the symptoms in a number of patients and in the corresponding animals injected is shown in Table 2 and Figures 9 and 10. The incidence of the chief symptoms in animals and that in man correspond roughly, and are characteristic of the groups studied. The parallelism, while not manifest in every instance, was often striking. This was particularly true in myoclonic encephalitis, spasmodic torticollis, respiratory arrhythmia and chorea. A striking difference with respect to invasion of the blood and incidence of lesions of the heart was noted between the streptococcus from chronic forms of encephalitis and that from acute chorea. In encephalitis, the blood was nearly always sterile; in chorea, the streptococcus was isolated in 30 per cent of the animals injected intracerebrally (Table 2). Lesions of the heart almost never occurred in the animals injected with the streptococcus from epidemic encephalitis and allied conditions; while lesions of the endocardium or myocardium occurred in a fair percentage of animals injected intracerebrally with the streptococcus from acute chorea. This difference was even more striking following intravenous injection, lesions of the heart occurring rarely in the former disease and in a high percentage of animals in the latter. The lesions in the animals resembled those noted in the spontaneous disease in man. Hemorrhages in heart valves were common, and subendothelial nodules developed soon after injection. The vegetations were never large, and small, localized grayish white areas were commonly observed beneath the endocardium, in papillary muscles and in chordae tendinae.

Table 2.—Percentage Incidence of Symptoms and Mortality Following Intracerebral Inoculation of the Streptococcus

Source of strain	Number of Cases	Animals Injected	Mortality	Muscular Spasms	Nystagmus	Rhythmic Movements	Tic-like Movements	Ataxia	Turning of Head	Tremor	Hyperpnea	Paralysis	Lethargy	Streptococcus from Brain	Streptococcus from Blood
Parkinsonian encephalitis	5	16	94	6	6	19	6	69	6	75	6	13	0	88	6
Myoclonic encephalitis	2	7	100	86	0	0	0	14	0	86	43	0	0	71	0
Respiratory arrhythmia	2	7	71	0	0	0	0	43	14	29	86	14	0	71	0
Spasmodic torticollis	4	8	50	0	25	13	63	88	38	13	13	13	0	63	13
Chorea	3	26	85	12	8	54	12	69	8	38	4	4	0	69	31

Microscopic study of sections revealed erythrocytes and a variable number of leukocytes and round cells in the hemorrhagic areas of heart valves, and there was evident a rapid transition from leukocytic infiltration in the lesions of recent origin, in both the valve and the heart muscles, to large mononuclear infiltration surrounding blood vessels and between muscle fibers, in experiments of longer duration. The latter often closely resembled the Aschoff bodies noted in the myocardium in rheumatic fever and

chorea in man. Sections stained by Gram's method revealed diplococci in the lesions, including those resembling

Fig. 9.—Peculiar facial expression and posture of a young girl, which developed together with alternating attacks of apnea and noisy forced respirations following an attack of influenza two years previously.

Aschoff bodies, as long as twenty-five days after intracerebral injection, in animals that were recovering and were anesthetized for examination.

Dental Foci of Infection

My own experiments on elective localization were not limited wholly to foci of infection outside the dental area, but included various localized infections in this field. Characteristic localization followed inoculation of cultures made from the depths of pyorrheal pockets; from the apical region of pulpless teeth, both when roentgenograms revealed appreciable areas of rarefaction and when they did not; from pulps that had become infected as the result of hematogenous infection in healthy teeth or through direct extension from caries; from pulp stones; from pus from discharging dental sinuses, and from material contained in abscesses in the jaw after the extraction of infected teeth. The findings in two cases, one of dental neuritis and myositis, the other of myositis and periarthritis, illustrate the extremely specific effects often noted in strains isolated from dental foci, and the difficulties involved in the therapeutic application of the principles of focal infection and elective localization.

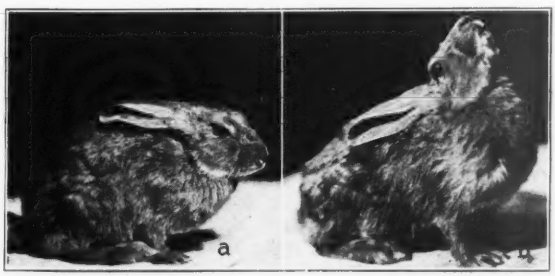

Fig. 10.—Rabbit injected intracerebrally with a highly diluted culture of streptococci from the nasopharynx of a patient shown in Figure 9, after one animal passage and forty-seven rapidly made subcultures. The animal developed marked disturbance of respiration soon after inoculation, and after this disturbance disappeared, it developed a peculiar tendency to throw its head backward.

REPORT OF CASES

CASE 1.—*History*—A woman, aged 35, with a history of severe migraine, had suffered from recurring attacks of neuralgia of the face for six years prior to my study. Each attack began with severe pain and swelling over the left upper jaw, which spread to the opposite side, and soreness of the teeth, especially of the upper jaw, and was followed by intense pain in the left side of the head, neck and shoulders. During the two previous years, the attacks had become more frequent and so severe as to necessitate the frequent use of morphin. They always ended with spasms of the muscles, tenderness and swelling of the neck on the left side. The tonsils had been removed four years before. A devitalized second left upper molar showing rarefaction was removed, the left maxillary sinus drained and a piece of the left turbinate removed, but without relief. The patient had become extremely nervous and, at times during the paroxysmal pain, hysterical. Several times, symptoms suggesting petit mal were noted.

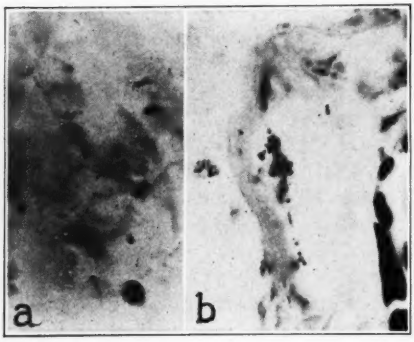

Fig. 11.—Diplococci (*a*) in the excised muscle, and (*b*) in the vessel in the center of a fibrous node ten days after the disappearance of symptoms of a recurring attack of dental neuritis and myositis.

Examination.—This revealed a poor vasomotor tone, but was otherwise practically negative. There were no signs of organic disease of the central nervous system. Roentgen-ray examination of the jaws and roots of the teeth was negative. There was tenderness over the left infraorbital and mental foramina, but no superficial tenderness of the overlying skin. There were tender nodules, which appeared to be enlarged glands, in the posterior triangle of the left side of the neck. There was a clean tonsillectomy scar. Except for a moderate hypertrophic rhinitis and a tender first upper left molar, from which a crown had been removed because of irritation of the gums, the condition of the nose, gums and teeth was normal. The maxillary sinuses were clear. Owing to the fact that each attack began with swelling of the left upper jaw, opposite the painful tooth, this tooth was extracted. A semilunar eroded area 2 mm. in diameter was found near the apex of the largest and innermost fang. The surface of this was sterilized with

Fig. 12.—Hemorrhagic infiltration opposite the apex of a lower incisor and surrounding the foramen of exit of the inferior dental nerve of a rabbit injected intravenously with a streptococcus from the tooth of a patient having recurring attacks of dental neuritis and myositis.

a searing blade and the root canal at the apex drilled into with a sterile dental burr. The pulp cavity was found filled with foul-smelling pus. There was a large cement filling directly opposite the dead pulp. The primary cultures of the pus from this tooth in ascites-glucose agar and broth yielded a pure culture of the slightly hemolyzing streptococcus. The anaerobic cultures on blood-agar slants and in tall columns of ascites fluid containing sterile tissue covered with balsam oil had a foul odor, and many short chains of streptococci and numerous bacilli resembling *Bacillus fusiformis* were found.

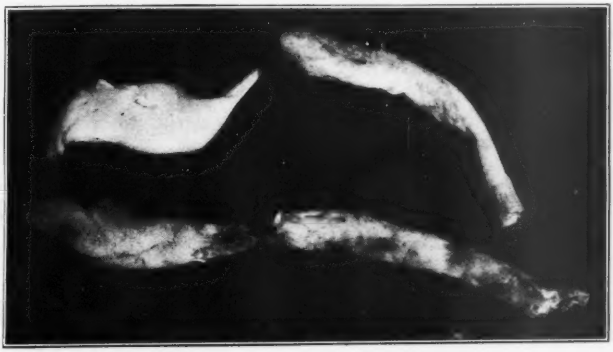

Fig. 13.—Numerous hemorrhages in the pulp of the left lower cuspid and corresponding nerve of a dog injected intravenously with streptococci isolated from the foul pulp of the patient's tooth. The corresponding pulp and nerve on the right side are free from hemorrhage; × 2.

Course.—Immediately after the extraction of the tooth, the patient developed an unusually severe attack, from which she gradu-

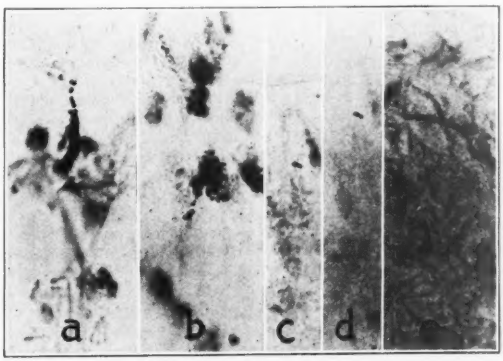

Fig. 14.—*a*, diplococci and double chain of streptococci in the hemorrhagic and infiltrated inferior dental nerve shown in Figure 13, *b*, diplococci in hemorrhagic dental pulp shown in Figure 13; *c* and *d*, diplococci in infiltrated pulp of a tooth of a guinea-pig injected intraperitoneally with a streptococcus from the pulp of a patient's tooth; *e*, diplococcus in the tissues around the edematous tissues opposite the left upper molars in rabbit injected intravenously with streptococci from the tooth.

ally recovered after several exacerbations. In ten days, she was free from pain and was feeling well. A tender nodule, thought to be a lymph gland, and a part of the sternocleidomastoid muscle on the left side were excised. The excision of these tissues precipitated another violent attack of pain and spasms of the muscles of the left side of the neck. A streptococcus identical to the one isolated from the tooth grew in cultures from the muscles and from the nodule. The organism was demonstrated in sections of each (Fig. 11). The elective localizing power of the streptococci from the tooth and from the tissues of the neck was identical and extremely marked. The streptococcus tended to localize in dental pulps, in and around dental nerves (Figs. 12, 13 and 14), and in muscles of four species of animals, in some instances even when injected intraperitoneally. Of the twenty-four animals (fifteen rabbits, three guinea-pigs, one dog and five mice), seventeen (71 per cent) had myositis; thirteen (54 per cent), lesions of the periosteum opposite teeth or at nerve foramina; twelve (50 per cent), lesions of the pulp of teeth, and ten (42 per cent), lesions of the dental nerves.

Treatment.—A vaccine was prepared from the streptococcus and used in the treatment of the patient. The first dose, consisting of 25,000,000, was followed by marked muscle-pains, especially of the left side of the neck; nausea; extreme exhaustion, and slight fever. The subsequent injections were at first diminished and then gradually increased, in an effort to produce a distinct but not severe reaction following the injection. Three months after the extraction of the tooth, the attacks were milder, of shorter duration and less frequent. There was marked improvement in the general nervous tone and the patient had gained 30 pounds. The vaccine was then discontinued for four weeks, while the patient was on a vacation. When she returned, the same sized dose of vaccine was administered. A marked swelling appeared at the point of injection, followed by repeated severe attacks similar to those previously experienced. One year after the experiment was performed, roentgenograms of the jaw showed rarefaction of bone at the apex of another molar on the same side, which was not present at the former examination. This molar was extracted. Cultures gave the same type of organism as that isolated previously, and injections into rabbits were followed by similar localizations. Cultures from the stool and from the pharynx both gave the organism, as before. That from the stool when injected intravenously into two rabbits gave the characteristic localization.

Comment.—Considering that the organism was present in the mucous membrane of the nasopharynx, in the sputum, in the stool, and again in another tooth, and because the condition had existed so long, little hope for recovery was entertained. The patient was not heard from for five years, when it was learned that after removal of the additional focus, recovery was uneventful and the patient had regained full health.

CASE 2.—*History.*—A middle-aged physician who had had repeated attacks of acute tonsillitis for many years, after two such attacks, and while in medical school, developed hydrops of the left knee. He had had repeated attacks of lumbago, usually with mild myositis, involving chiefly the flat muscles around the back, neck and thorax. As foul-smelling, cheesy plugs kept forming in the tonsils, tonsillectomy was performed. The symptoms were absent for about two years. Then followed a loss of endurance, a prolonged low-grade arthritis, which involved the small joints of the hands, a number of attacks of myositis, irritability of the bladder, presumably due to infection of the prostate and a troublesome hyperchlorhydria. The joint and muscle symptoms became worse after inflammation of the tonsil tissue in the base of the left tonsillectomy scar. These symptoms, and those referable to the bladder, disappeared promptly after the removal of the remnant of the left tonsil, which contained a small abscess filled with foul-smelling pus. The streptococcus from this abscess and from shreds in the urine produced arthritis, chiefly of the peripheral joints, and myositis, in the four rabbits injected.

About two years later, the patient had an attack of myositis and subacromial bursitis, a typical attack of so-called "painful shoulder," and the symptoms referable to the bladder returned. They were never severe, but persisted for a number of months. The pain caused by the bursitis was severe at first, and was associated with tenderness of the deltoid and triceps muscles on the affected side. The symptoms grew milder during several months, and then persisted practically unchanged for nearly a year. The nine rabbits injected with the streptococcus from the shreds in the urine developed myositis and subacromial bursitis. A devitalized molar, believed to bear a causal relationship, was extracted, even though the roentgenogram was negative. A small granuloma was found so situated that its demonstration was impossible in the roentgenogram.

The granuloma was incubated for a short time. A pure culture of slightly hemolyzing streptococci was isolated, and a large colony of streptococci was found near the apex in intimate relation to the blood vessels. The symptoms referable to the shoulder disappeared promptly, a result strikingly similar to those reported by Evans in this painful affection. No further joint or muscle symptoms developed for seventeen months, when a mild attack of myositis and symptoms of hyperchlorhydria again occurred.

Examination.—At this time, three devitalized teeth with defective root-canal fillings were revealed. Two of these, the two left lower bicuspids, had been devitalized eighteen years before; the third, a right lower molar, had been devitalized six years before. The

Fig. 15.—Appearance of devitalized tooth that became infected, showing no area of rarefaction five years after devitalization. With the streptococcus, the patient's condition was reproduced in animals.

roentgenogram of the first two showed increased density of the structures around the roots, and one showed a faint line of rarefaction over the apex, while the molar appeared to be normal. The material, which was removed in a sterile manner from the canals of the first two teeth, contained pure cultures of a green producing streptococcus. Antiseptic treatments had efficiently sterilized the canals, but it was feared that the tissues beyond could not be thus sterilized, and the three devitalized teeth were extracted under sterile conditions. Cultures from the apices showed streptococci in each. These cultures were injected into three rabbits, all of which developed characteristic lesions.

Course.—Immediately after the extraction of these teeth, the patient developed a sharp attack of myositis of the lower right side of the thorax. A number of months after recovery from this attack, symptoms referable to the muscles and small joints returned, coincidental with an infection of the gum, which had become painful from pressure of an improperly fitting denture. With the correction of this difficulty, the myositis again subsided. At the time the three devitalized teeth were removed, it was believed that devitalization of a tooth, proved to be sterile, was a safe procedure, provided the root canal was filled properly in a sterile manner; hence, two teeth highly desirable for abutments were devitalized and the root canals filled by an expert, the filling being controlled by employment of the roentgen-ray (Fig. 15). Roentgenograms were made from time to time, but no areas of rarefaction developed. About four years after devitalization of these teeth, the patient experienced gradually increasing pains around the smaller joints, recurring attacks of myositis and lumbago, stiffness of the muscles in the morning and lack of endurance. Owing to the increased severity of these symptoms and the absence of apparent foci elsewhere, the devitalized tooth shown in Figure 15 was removed. A pure culture of the streptococcus that had marked affinity for the muscles and joints of rabbits was obtained. Owing to this finding, it was decided that the other tooth devitalized at the same time should also be removed.

A complete roentgen-ray examination, in which careful search was made for possible residual areas in the region of the jaw, from which teeth had been removed years before, revealed an area of rarefaction at the point where an infected third upper molar had been extracted, eight years previously. This area was curetted at the same time that the last devitalized tooth was removed. Cultures from the curetted material showed countless numbers of colonies and from the tooth a large number of colonies of partial-tension streptococci, which on intravenous injection into rabbits and guinea-pigs produced severe lesions in the muscles and joints. Moreover, the roentgenograms revealed the presence of one of the guttapercha points over the apex of the devitalized tooth (Fig. 15). After a third operation, performed two weeks after the last extraction to remove this guttapercha point and the small granuloma surrounding it, a sharp attack of myositis of the back and thorax developed. The pains in joints and muscles since the elimination of these foci, five months ago, have largely disappeared, and endurance has increased.

Comment.—The points of particular interest in this case are the symptoms of the same type recurring in numerous attacks over a period of many years, nearly always coincidental with the develop-

ment of active foci of infection or acute infections of the nasopharynx, and the marked relief from these symptoms following the removal of the active foci containing the organism with which the symptoms were reproduced in animals. The facts that antiseptic treatments of the root canals, while efficiently sterilizing the substance of the tooth, did not sterilize the periapical tissues around the devitalized tooth, and that mere extraction of the infected tooth was not sufficient to prevent an encapsulated infected area in the jaw, are also significant. Control experiments with the cultures from the streptococcus obtained from the buccal mucous membrane at the time of the removal of this tooth proved negative.

Certain observers have suggested that the part played in the causation of systemic diseases by chronic localized infections around the teeth and jaws, particularly infected pulps, apical abscesses and granulomas, must be unimportant, because the wall of connective tissue in a granuloma makes invasion of the blood stream by bacteria impossible or highly improbable; and that, since these conditions are so often free from symptoms, they must be harmless. In the light of the experimental results, this explanation is no longer tenable. It is well known that new blood vessels are formed

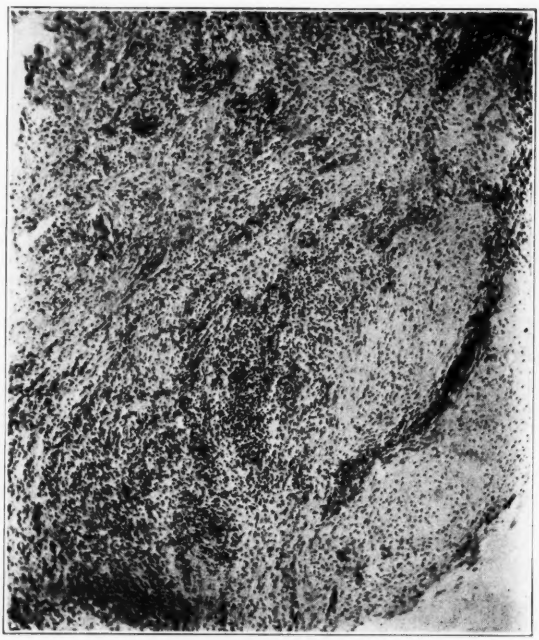

Fig. 16.—Section of a granuloma over the apex of a tooth fractured eleven years previously in a patient suffering from an acute attack of iritis. The variation in age of the connective tissue as shown by the degree of cellular infiltration may be noted. Diplococci were readily demonstrable in the highly cellular areas near the blood vessels, especially along the periphery (Fig. 17).

during inflammatory reactions at the point of insult, in this instance due to living bacteria. It has been shown that the bacteria in granulomas and pulps of teeth occur chiefly at the periphery and where the connective tissue is highly cellular or embryonic in character; where leukocytic and round-cell infiltration is present; where new blood vessels are being formed, and adjacent to or within the larger blood vessels (Figs. 16 and

Fig. 17.—Leukocytes and diplococci at periphery of the granuloma shown in Figure 16.

17). Hence, absence of symptoms should be regarded as evidence that good drainage is being maintained, rather than that these foci have become dormant and encapsulated.

The earlier cultural and experimental studies of Moody,[14] and Hartzell and Henrici,[15] have demonstrated that areas of rarefaction around pulpless teeth are commonly infected, and that the bacteria isolated have a wide range of infecting power. The frequency with which bacteria having elective localizing power occur in dental foci, especially in and around pulpless teeth; the relative importance of the roentgen-ray positive and the roentgen-ray negative devitalized tooth, and the influence of heredity, are among the problems which remained obscure until the publication of the researches of Meisser,[16] Price[17] and Haden.[13] Meisser, working in my laboratory for four years, and in the department of dental surgery of the Mayo Clinic, demonstrated that bacteria, chiefly green-producing streptococci, from various dental foci, usually had a high degree of elective localizing power; that nearly all pulpless teeth and periapical tissues of persons having various diseases were infected, and that the roentgen-ray-negative tooth may harbor streptococci that have a higher degree of specific invasive power than those isolated from pulpless teeth in which marked rarefaction is apparent. He also observed that cultures made in a similar manner from normal teeth remained sterile. Price, working along clinical and experimental lines, found the pulpless tooth infected, and noted that pulpless teeth without rarefaction were more dangerous as regards continued health than those with rarefaction, a fact which he interprets on the basis of inherent resistance in individuals, the former occurring in the highly susceptible, the latter in the highly resistant.

The quantitative studies of Haden on the relative number of bacteria at the apex of pulpless teeth, together with their localizing power, are of the greatest

14. Moody, A. M.: Lesions in Rabbits Produced by Streptococci from Chronic Alveolar Abscess, J. Infect. Dis., 19:515-525, 1916.

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importance. His demonstration that great variations in number exist, that cultures from teeth showing rarefaction sometimes had no localizing power, when at the same time roentgen-ray negative teeth revealed countless numbers of colonies of streptococci which reproduced the lesions of the patients in animals, calls for complete revision of our views regarding the importance of the pulpless tooth.

Clinical Application of Experimentally Demonstrated Facts

The clinical studies on this subject have become so numerous and have covered so wide a field that it is impossible in this résumé adequately to consider even the more important contributions. The earlier clinical studies by Billings,[1] Gilmer,[18] Irons,[5] C. H. Mayo,[19] Hartzell,[20] de Schweinitz,[21] Duke,[22] Deland,[23] Black,[24] Ulrich,[25] Thoma,[26] Fischer,[27] Jones,[28] Pierrepont[29] and others made it clear not only that localized infections were present in a large proportion of persons having various systemic diseases, but that in suitable cases removal of suspected foci commonly resulted in relief from symptoms, and recovery. A study of the voluminous literature that has accumulated since the earlier work reveals the fact that the results reported from the removal of foci of infection vary from the most favorable to the completely negative. In general, it may be said that the good effects noted occurred in proportion to the thoroughness with which the principle was applied. It is to be regretted that so few experimental studies in animals were made; for it is noteworthy that improvement followed with great regularity in our cases after removal of foci proved to contain the organism with which the disease was reproduced in animals. In the myositic group, localized infections around teeth and in tonsils were demonstrably present in nearly all of the twenty-eight patients studied. Improvement in symptoms, often striking, occurred in all but one of the twenty-five patients from whom foci were removed, in each of whom the focus was shown to contain bacteria that tended to produce lesions in the muscles of animals; while in the one patient in whom improvement did not occur, the bacteria failed to produce lesions. In some patients, recurrence of myositis or only partial recovery was found to be due to defective tonsillectomies, to inadequate dental operations, to failure to recognize the existence of foci in teeth or to the de-

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19. Mayo, C. H.: Mouth Infection as a Source of Systemic Disease, J. A. M. A., 63: 2025-2026, 1914.

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velopment of new localized areas of infection.

The value of the removal of tonsils in the cure, and especially in the prevention of diseases, is now universally conceded. The relief of systemic conditions after removal of dental infections, while remarkable in many instances, has not occurred with the desired regularity, and not infrequently exacerbations follow such removal or attempted removal. The fear entertained by many clinicians of having dental foci removed on account of such exacerbations is well founded; but it is a mistake to conclude that the foci should not be removed. Instead, the temporary exacerbation of symptoms should be regarded as experimental proof of causal relationship of the highest order, and as evidence that the method was probably faulty. Pulpless teeth may do no apparent harm over a period of years, and then, for reasons that may be obscure, become a feeding focus and produce serious systemic effects.

The dental area is only one place of many where a responsible focus may exist. The decision as to when to have evident dental foci removed in certain instances requires sound judgment, which can come only from the closest cooperation between physician and oral surgeon. Undue emphasis has been placed on purely clinical results. Too much has been expected and too much promised. It is often expected that conditions existing for years will be relieved by the removal of a single tooth. Tonsillectomy without elimination of infection in the dental area is irrational. The conclusions reached from observations made heretofore must necessarily be far from correct. As far as I know, clinicians have not considered seriously the importance of the devitalized tooth which is negative in the roentgenogram. Almost without exception, these teeth have been regarded as harmless and allowed to remain, in the belief that they were free from infection. We are just beginning to find out that the pulpless, roentgen-ray negative tooth may be a worse offender than the tooth that shows rarefaction. This fact, and the recent discovery of the symptomless residual abscess in edentulous jaws containing streptococci with which the patient's condition may be reproduced in animals—a factor also not even thought of in the past—call for a restudy of the whole question before final conclusions can be drawn.

Our conception of focal infection should not be too mechanical. Bacteria are very small, and if invasive powers are high, they may gain entrance through relatively normal mucous membrane or slight collections of lymphoid tissue. In order than an infection from septic foci may become established in remote body tissues, the same forces of resistance which afford protection against microbic invasion from other sources must be overcome. A focus of infection wherever found, even though in the intestinal or genito-urinary tracts, and which for mechanical reasons can neither heal nor drain, teeming with micro-organisms, should be regarded as a test tube with permeable walls embedded in the tissues, where absorption channels for bacteria and their products are afforded. In consequence, the play between the living bacteria and their products, and the protective mechanism of the host, becomes forced. A certain degree of immunity no doubt results, but since the streptococci usually present are poor antigens, the immunity induced is transient; and, since a state of increased susceptibility or hypersensitiveness from overstimulation may supervene, the protection may be inadequate. The place of localization of bacteria, aside from the influence of a lowered resistance, local or general, and from that of injury, fatigue, strain, improper food, bad hygiene, disease, heredity and so forth, depends largely on the peculiar infective capacity, or the

peculiar poison producing power, of the bacteria in question.

Devitalization of teeth, as practiced in the past, has been proved to be a dangerous procedure and should cease. Suitable restorations have been devised which no longer make this necessary. Simple extraction of infected teeth is not always sufficient to insure freedom from infection in the jaw, particularly of the tooth that has become infected after artificial devitalization. Filling in of bone as revealed by roentgenograms, following root-end amputations or the antiseptic treatment through root canals still in vogue, does not necessarily mean that infected areas around teeth have become sterile. Just how often and in what particular cases clinically measurable benefits will result from removal of dental or other foci of infection after they are once established remains for the future to decide. A careful study of the clinical and experimental data now available shows that a sane and comprehensive effort toward the prevention and cure of septic foci in dental and other areas is a sanitary measure of first rank that should result in the alleviation of suffering, better preservation of the tissues in old age, longer average duration of life, increased mental and physical efficiency and the prevention and cure of acute and chronic systemic disease, and, through the laws of heredity, make for a sturdier race. In the prevention and eradication of focal infection in the dental area, the dental profession may be depended on to render its large share of service in the preventive medicine of the future.[29]

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ESTHETICS

By J. W. CRAWFORD, D.D.S., Milwaukee, Wisconsin

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

IN all discussions of esthetics in full denture construction, the points of emphasis have been tooth form, arch form and color or hue. Little has been said concerning the restoration of the patient's face to any previous harmony.

I desire to call your attention to the work of such men as Williams, Orton, Lowery, Cross and Nelson as having very thoroughly covered the subject of esthetics from the standpoint of tooth form, arch form and color or hue. Therefore, I shall eliminate a discussion of that part of esthetics.

In confining my paper on esthetics to a discussion of restoration of the anatomy, which has been disturbed through loss of teeth, I may have to inject certain steps in technic that seem important to me in demonstrating how we may obtain correct anatomic relationship, and why.

Esthetics, according to the dictionary, is "the science of the beautiful in nature and art, especially that which treats of expression, of the embodiment of beauty by art, harmony."

For the purpose of my discussion, I have chosen harmony of face form (anatomic relationship).

In the human anatomy, we have no absolute symmetry of development. Especially is this true in the development of the head and neck. The factors, food and function, play so prominent a part in the development of this limited area that many changes occur after birth to make this development asymmetrical.[1]

This change in the development of the bones and tissues of the face makes it necessary to have some method or technic which enables us to distinguish an abnormal condition from an asymmetrical development, and, in the construction of dentures for an edentulous patient, again to place the mandible in the relation to the maxilla that will reestablish harmony and make the phrase "anatomic relationship" really mean something.

Anatomic relationship concerns all the muscles and structures of the masticating mechanism, when so placed that they will coordinate in the function of mastication and produce muscular balance, and harmony in face form as well. Esthetics today has come to mean all that the term "harmony" implies.

We cannot have harmony by producing in one detail alone that which is pleasing to the eye, without due consideration to the mechanism as a whole.

We know that asymmetrical development of the head and neck prevails, but to be able to diagnose the degree of asymmetry in any given case, we must first know what constitutes symmetrical development in that particular case. Like the physician and the artist, we must know anatomy and physiology to be able to distinguish the abnormal from the normal development. Therefore, we must know the fundamental principles of symmetrical development, and the coordination and function of the entire area that we intend to restore to the highest degree of function and harmony attainable. In other words, we must do

1. Monson, G. S.: Monson Study Club Reports 1910-1917. Wright, W. H.: Deafness as Influenced by Malposition of the Jaws, J.N.D.A. 7:979 (Dec.) 1920. Chapman: Internat. J. Orthodontia, February, 1923.

corrective restoration as well as mechanical restoration.[2]

How does the all-wise Creator establish anatomic relationship and harmony, or esthetics? We find in fetal development that, about four weeks after conception the tooth crypt is forming, and classification is taking place about the eighteenth week (Fig. 1). On the day of birth, we find all the crowns of the deciduous central incisors calcified, two-thirds of the laterals, more than half of the cuspids, about one-third of the first deciduous molars and about one-fourth

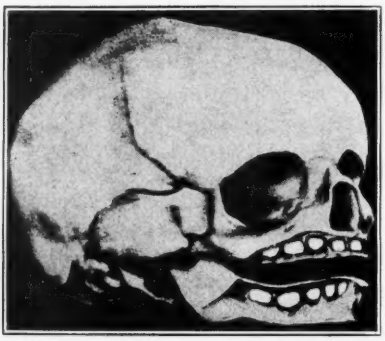

Fig. 1.—The skull at term.

of the second deciduous molars. The fact that all this tooth structure is formed and calcified from six months to three years before eruption indicates that the Creator had a predetermined position for the deciduous teeth; had predetermined the distance between the mandible and maxilla by the length of crown, and had predetermined the size of the arch of the mandible and maxilla, by the mesiodistal measurement of each tooth, which also predetermines the necessary osseous development of the mandible and maxilla to contain these teeth. It also predetermines the length and size of the muscles of mastication and expression, the development of the bones of the skull as well as the proper development of the ramus and condyle and the function of the same. Because this development is predetermined, we are charged with the responsibility of administering food that will require the proper function to develop and attain the necessary anatomic and harmonious relationship.[3]

That there is an underlying principle involved in this development is again and more forcibly emphasized in the fact that, on the day of birth, the entire occlusal surface of the first permanent molars is formed and calcified, six years

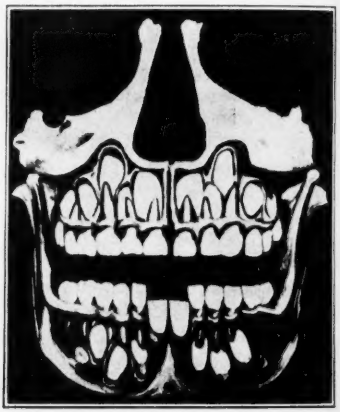

Fig. 2—Dentition at 6 years of age.

before eruption, indicating that there must be an underlying fundamental principle involved in the development to predetermine anatomic relationship six years before these teeth take their place and perform their function, as a correlating factor in the harmony and coordination of this wonderful mechanism. (Fig. 2).

Again, in this development of the permanent teeth, there is the same anatomic relationship predetermined and the greater size of the permanent teeth demands greater development of osseous structure. Osseous structures do not develop unless function of the muscles takes place. Right here, let me say that

2. Footnote 1, first reference.

3. Footnote 1, first and third references.

the first noticeable indication of the result of lack of proper food and function (arrested development) is in a lack of investing structure, to accommodate the permanent teeth.[3]

The development of the fetus is a physiologic process not dependent on more than ordinary health in the prospective mother, and the development of the investing tissue, for the deciduous teeth, is well under way at term. Lack of breast feeding and proper food and function, during the first five years of the child's life, does not often result in a malformed deciduous arch and malposed deciduous teeth, because their form and position are determined before environment becomes a factor; but lack of proper food and function and the result of habits formed during this first five years make for a decided deficiency in the symmetry, harmony and function of the permanent masticating organs. The degree of arrested development can be determined only from a knowledge gained by the study of subjects of high development and a full complement of teeth, regular and well posed.

In Figure 3, the location of the walls separating the cavities of the face, the long axis of the teeth converging to a common center and the lines of stress may be noted.

Fig. 3.—Lines indicating walls separating cavities of the face, the long axis of the teeth converging to a common center.

In subjects of high development, we find a symmetry of face form, indicating muscular and osseous development. We

Fig 4.—Left: Position of the condyle in skull with teeth with abraded cusps; right: condyle in the forward position in glenoid cavity when cusps are intact.

find the distance between the base of the nose and tip of the chin approximately equal to one-third of the measurement from the tip of the chin to the top of the skull.

In Figure 4, the position of the condyle in the skull with teeth with abraded cusps (left) and the condyle in the forward position in the glenoid cavity when cusps are intact (right) may be noted.

We find a well developed angle and ramus of the mandible and condyles well

surface of the teeth conforms laterally to an arc of the same radius; and we find the head of the condyle conforms laterally to an arc of the same radius.

In Figure 5, wear on the buccal cusp, (left) may be noted. The other mandible shows full cusps and curves (Fig. 6).

We also note that the long axis of the mandibular bicuspids and molars converge and intersect at a point about 4 inches above the occlusal surface of the teeth, and that this point is also the

Fig. 5.—Left: Mandible with teeth with abraded cusps; right: cusps intact.

forward in the glenoid cavity. Encroachment of the condyle on the external auditory meatus indicates a malposition or development of the mandible or maxilla and a malrelation of the arches. In the subjects of high development, we find the teeth well posed and proper interdigitation.[4]

We find in the mandibular teeth, the occlusal curve or curve of Spee, or the anteroposterior curve (of the bicuspids and molars) and the center of the condyle tangent to, or concentric with, that curve. We also note that the occlusal intersection of the radial line of the lateral curve and also of the curve to which the head of the condyle conforms.[2] In fact, when the radial lines of the arcs formed by the occlusal surface of the teeth both laterally and anteroposteriorly and the arc formed by the condyles do not intersect, or when these arcs are not the same or concentric arcs, then the lateral excursion of the mandible is limited to the degree that they are not concentric. In fact, every arc and curved surface has a radial center which should be in common to insure coordination of all parts involved in the function of mastication and deglutition. That there is a definite relationship between

4. Monson, G. S.: Impaired Function as a Result of Closed Bite, J.N.D.A., 8:833 (Oct.) 1921.

the occlusal curve and the condyle cannot be questioned. The important thing is to establish that relationship in each case[2] (Fig. 7).

After all is said on the subject, every detail in the construction of full dentures is a part of esthetics. All details are based on our ability to diagnose the abnormal from the normal; reestablish harmony in the anatomy as well in the mechanical restoration, and produce efficiency, function and that which is pleasing to the eye.

To correct the change that has taken place in the anatomic relationship of the masticating mechanism from the time of extraction of the first permanent tooth to the edentulous stage, we must be able to visualize the anatomic condition of the patient when all the teeth were in position. If the patient has a picture taken at that period, it may be used as an additional guide.

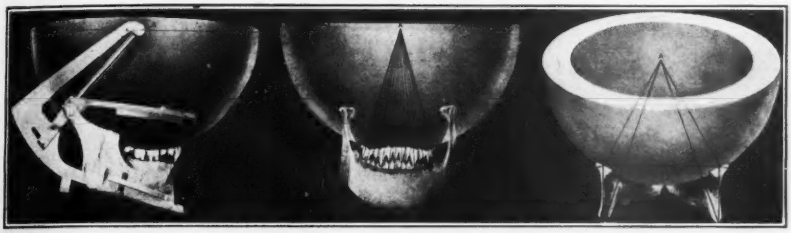

Fig. 6.—Monson's spherical charts.

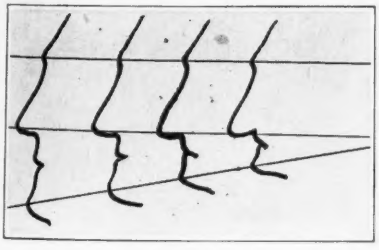

Fig. 7.—Changes in facial dimensions that take place when abrasion or loss of teeth occurs.

To establish the correct distance from the base of the nose to the tip of the chin, or the normal facial dimension, use occlusal rims of a rigid material built with wax to conform to Dr. Black's average length of the crowns of the anterior teeth plus the estimated amount of absorption without upholstering the lips and cheeks (Fig. 8).

We find, in the highest type of development, that the backward thrust of the condyle is only slightly felt when the little finger is placed in the external auditory meatus. If a decided thrust or encroachment is felt, the occlusal rims are not high enough. If it is not felt at all, the occlusal rims are too high and should be cut shorter. Should the age

Fig. 8.—Testing for condyle encroachment.

of the patient or condition of the muscles indicate that return to that length and muscle tone is too great, judgment should be used and occlusal rims trimmed to as nearly normal length as conditions will permit.

The median line is now marked on both the upper and lower occlusal rims. The transfer plate is now fastened to the upper occlusal rims, and upper and lower occlusal rims are fastened together in central occlusion, transfer bow ends being adjusted to locate the condyle, and all screws fastened to maintain that relationship, and removed from the mouth (Fig. 9).

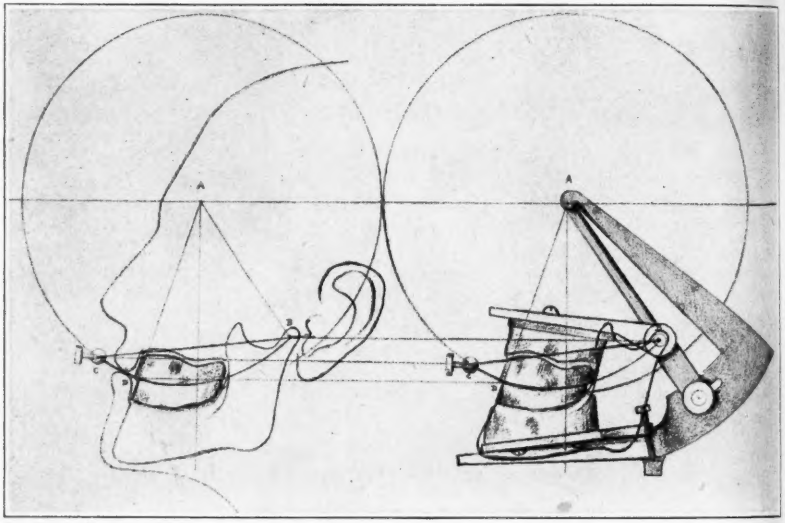

Fig. 9.—Monson's transfer chart.

Occlusal rims with a transfer bow are now placed on the lower cast and mounted on the mandibulomaxillary instrument (Fig. 10), to a 4 inch anterior radius. The posterior is taken care of by the transfer bow ends in apposition to the condyle rods on the instrument (Fig. 11).

Here again, let me state that this radius is only a working basis. The case may demand a shorter or longer radius as will be determined by check bites when the teeth are set up in wax and tried in the mouth.

The upper cast is now fastened to the instrument; the transfer bow removed, and lower occlusal rim removed from the base plate, which is fastened to the cast with wax. The teeth are now arranged with incisal and occlusal surfaces conforming to a 4-inch radius with the gingival saddles over the crest of the ridge to conform to an arch form determined on.

Figure 12 shows the mandible mounted on the Monson instrument.

If both lingual and buccal cusps conform to the radius, the anteroposterior, as well as the lateral curve, will result. Cases of asymmetrical development require asymmetrical arrangement of the individual teeth in the arch, maintaining

at all times occlusal curves to produce harmony in action and function.[5]

If we study the superficial muscles of the face and neck, we will readily see the necessity of reproducing anatomic relationship (Fig. 13).

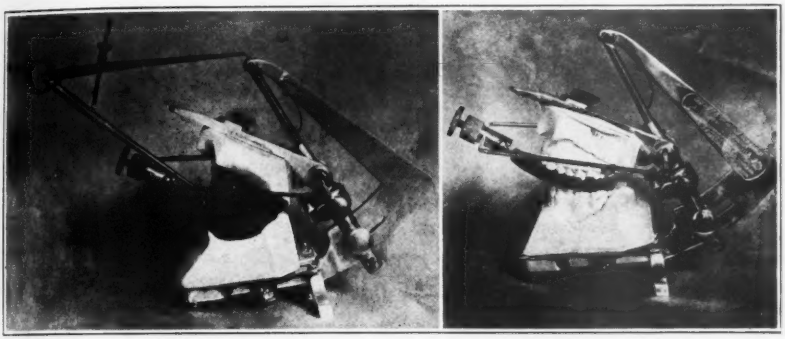

Fig. 10.—Technic for establishing the proper radius.

Again looking at the deeper tissues, we see the necessity of creating the vertical area for the tongue and lingual tissue. Let me call your attention to an article[6] by Robin, who gives a description and pictures of an overlooked cause of respiratory disturbances in the upper respiratory passages. The seat is in the oral pharynx, and the obstruction is due to a backward lowering of the root of the

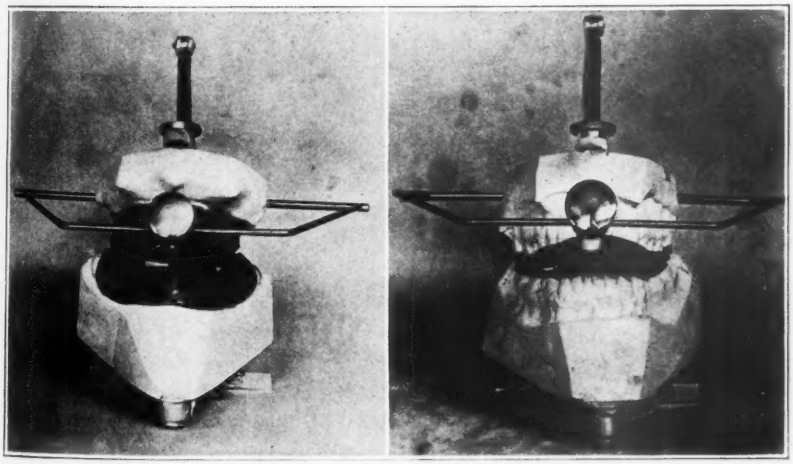

Fig. 11.—Anterior view of cast mounted on the Monson instrument.

5. Lowery, P. C.: Facial Expression an Important Factor in Full Denture Construction, J. A. D. A., 9:383 (May) 1922.

6. Robin, P.: Cosmos, June, 1923; Bull Acad. de med., Paris; Abstr. J. A. M. A., March 17, 1923.

tongue. To overcome it, the patient has to open the mouth. The angles of the jaw so that the lower teeth come in front of the upper ones. An apparatus which

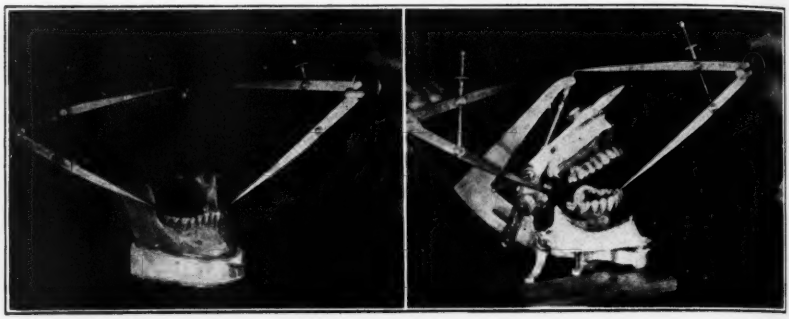

Fig. 12.—Left: Mandible mounted, showing teeth and condyle conforming to radius; right: full upper and lower denture set up.

lower jaw are nearer together than normal; the chin is receding. The causes such propulsion of the chin offers adequate treatment of the condition.

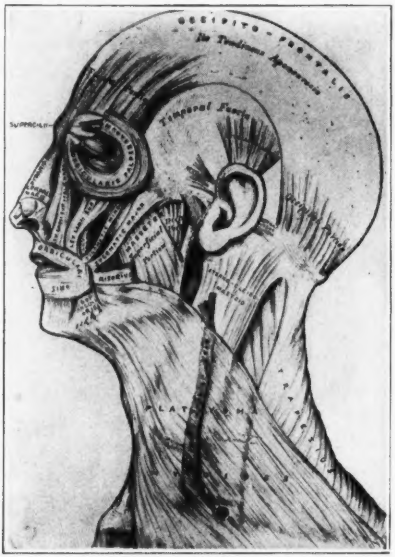

Fig. 13.—Facial muscles (Gray).

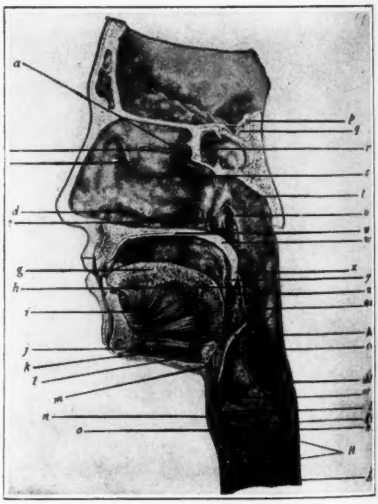

Fig. 14.—Vertical area of mouth, which should be reestablished to produce the proper esthetics as well as function.

respiratory difficulty ceases if the patient is instructed to protrude his lower

Those of you who have studied this question of anatomic relationship know that

such treatment is not adequate. The real cause has not been overcome.

A shortening of the vertical area must be remedied by a lengthening of the bite and proper relationship restored.

If a normal bone is used in a new way, its structure and form will change to meet its new function; if a deformed bone is rectified, and its normal function thus restored, that bone will reassume and retain its normal shape and structure, (Wolff's law).

Reproducing with restorations the condyle path, as we find it when patients

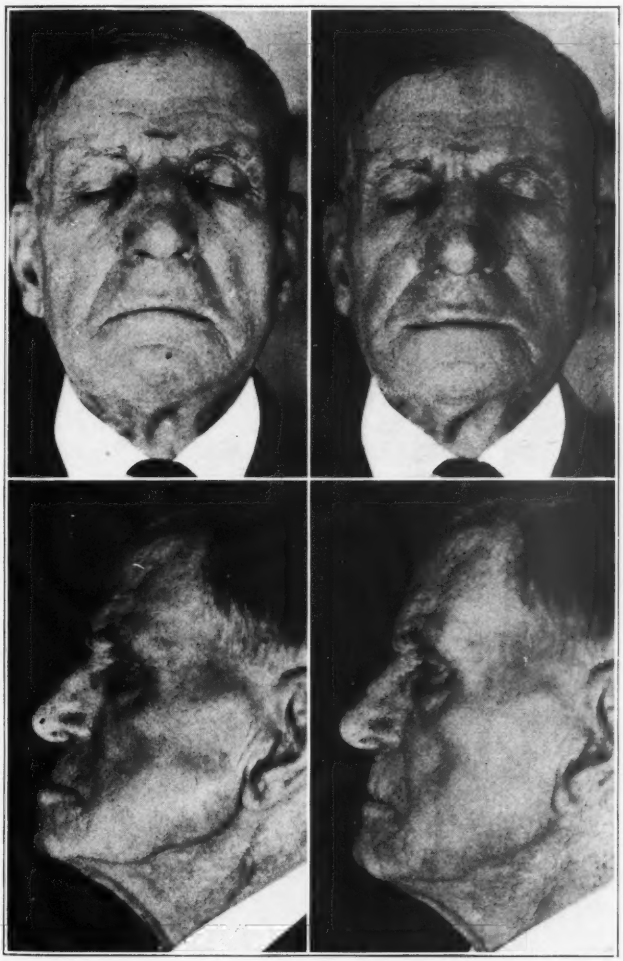

Fig. 15.—Appearance of patient (left) before and (right) after lengthening by 8 mm.

come to us, is perpetuating the abnormal. Registering that path should be considered only as a diagnostic point to guide us in correcting the same.

Mr. H., (Fig. 15), aged 72, had worn full upper and lower dentures for over fifteen years, with short dimensions and deflected mandible. On the right, the appearance after lengthening by 8 mm. is shown.

Fig. 16.—Left: Deflection and rotation resulting after removal of ramus and condyle; right: appearance after correction through full upper denture, the posterior teeth occluding so as to direct the mandible to the right and correct rotation.

Miss C., (Fig. 16), aged 23 years, had the left ramus and condyle removed when about 16 years of age, a deflection and rotation of the mandible and protrusion of maxillary teeth resulting. A full upper denture was constructed with the posterior teeth occluding so as to direct the mandible to the right and correct the rotated position as much as possible.

Discussion

R. G. Keyworth, St. Paul, Minn.: The subject of esthetics occupies a position of considerable importance in our relation with the full denture patient. A large majority of our patients are more concerned as to their appearance at the time of insertion of the completed dentures than with any other phase of the problem. It is through this appearance that we are able either to build up or to destroy their confidence in the artificial substitute for their own teeth. Every dentist knows that a great deal of persistence is required to master the art of wearing dentures, but how many of us realize the importance of this esthetic side of our work in creating the proper mental attitude on the part of the patient? A harmonious result and pleasing appearance is our best aid in obtaining the cooperation necessary in tiding the patient over the period of adjustment.

The scientific principles and mechanical art so necessary in the construction of artificial dentures should not be relegated to the background, but neither should we lose sight of the importance of the esthetic phase of this work. It is through this phase that the prosthetic dentist finds his only means of expression. It is through this phase that he enters the

field of fine art, and his position is challenged not only by the patient but also by the patient's family and friends. Every person with whom the patient comes in contact will have an opportunity to form a mental criticism of the dentist's artistic ability.

Dr. Crawford, in his discussion of this subject, has considered it from the standpoint of the picture as a whole rather than the detail of tooth form and color, and I believe this is as it should be considered. No artist would attempt to paint a picture without first obtaining the complete outline form. The method of stressing certain details is used only by the cartoonist in making grotesque caricatures for the amusement of the public. In stressing detail, we also are apt to neglect the complete outline form, with the result that our picture is grotesque, but far from humorous.

From the standpoint of esthetics, as Dr. Crawford points out, our first step should be the establishment of the correct relation of the osseous framework; in other words, the correct outline form in which to place our detail in restoring a natural expression. This requires the placing of the mandible in its proper relation to the maxilla and brings up the subject of what is the proper relationship of these bones.

It has been the custom heretofore, and still is with a great many dentists, to use the lip line as a guide for the establishment of the length of the bite. The lip is a transient tissue which drapes in any position to accommodate itself to the relationship of the jaws, and should not be used to determine the position of the mandible. Rather, the process should be reversed, and the relationship of the bony structures should determine the position of the lip and lip line. If I may use a homely expression, it would seem to me just as logical for an engineer in reestablishing the height of a broken down archway to use the position of the awning hanging from it as it is for the dentist to use the lip line as a guide in obtaining the length of the bite. I believe that the condyle test originated by Dr. Monson, is, when supplemented by a photograph, the most accurate method yet devised.

The establishment of the correct facial dimension by the relation of the mandible to the maxilla not only gives us a complete outline form in which to place our detail of tooth form, color and arrangement, but also supplies the proper area for the integument and the normal functioning of the muscles of mastication and expression. The hanging chops and flabby appearance characteristic of so many denture patients disappears, and the normal tone and tension of the muscles is reestablished. The outline of the vermilion border of the lips changes from the straight line to the cupid's bow curve through the tension put upon the fibers of the orbicularis oris muscle. The soft tissues of the face drape back to their normal position and lose many of the folds and wrinkles caused by the closed bite relationship.

In the selection of teeth, according to Dr. Williams' classification, it is necessary to have the normal facial dimension in order to obtain the proper tooth form. For example, the face may have a square outline with a closed bite, but when the bite is opened correctly, the face will be of a tapering form. This point was illustrated by Dr. Lowery before this body at Milwaukee, two years ago. Also, it will be found that in reestablishing the normal facial dimension in all cases, a harmony of edentulous arch form and face form will be noted in a larger percentage of patients.

Virtually all patients who reach the point of requiring full denture service have a much too tightly closed bite through a wearing down or malrelation of the few remaining teeth. Are we going to rebuild to this condition, maintaining the appearance of age and senility, or are we going to restore them to the appearance of youth and vigor, as it is within our power to do? We have the opportunity not only to rejuvenate the patient in facial appearance, but also to promote a more healthful condition of the structures adjacent to the oral cavity, and it is through this esthetic side of our work that we may obtain the cooperation necessary to take the patient through the adjustment period.

P. C. Lowery, Detroit, Mich.: It is essential that we have a concise, yet a complete understanding of the term "esthetics." The following is offered as a suggestion. Dental esthetics, the science that deduces from Nature the rules and principles of facial and dental art; dental art, the theory and practice of esthetics in the expression of beauty in form, size, arrangement and hue of the teeth and facial expression.

The application of our understanding of esthetics in denture prosthesis has created two points of view; for all art is divided into two distinct groups, the imitative and the creative. In the one group, we have those who believe that they are rendering the greatest service to their patients by copying or reproducing the actual condition that exists when the patient presents himself. The other group are those who believe that all cases presented for treatment possess certain abnormal conditions, and that they are rendering the greatest service by creating, to their conception, a development normal to that individual.

Each of the views are based upon findings and experience that have merit. However, to

follow one slavishly without due consideration of the other is fallacious. An accurate diagnosis and prognosis of the individual case should determine the method of procedure.

Dr. Crawford's paper states, "Osseous Structures do not develop unless function of the muscles takes place." Let it be stated that with the same token lack of muscle function causes absorption.

Another statement, "Should the age of the patient or condition of the muscles indicate that return to that length and muscle tone is too great, judgment should be used and occlusal rims trimmed to as nearly normal length as conditions will permit." I should like to ask Dr. Crawford how he determines that muscle tone is or is not too great?

The paper quotes another statement: "If a normal bone is used in a new way, its structure and form will change to meet its new function; if a deformed bone is rectified, and its normal function thus restored, that bone will reassume and retain its normal shape and structure."

This is the keynote for those of us who have not practiced the creative phase of denture construction, and a word of warning seems advisable, as bony structure does not change its form very rapidly.

The patient and operator must be prepared to withstand this period of development. The same fact is true regarding muscle tissue, only in a minor degree. This prognosis and consideration may be the means of a successful completion of a case that might otherwise be a failure. The statement "Reproducing with restorations the condyle path as we find it when patients come to us is perpetuating the abnormal," may be misleading to some and needs further explanation. You are only perpetuating an abnormality when it exists. There are cases in which we should endeavor to reproduce the condyle path as we find it registered in the patient when he is first seen. This is particularly true if it is normal to the individual.

In the ear test with the little finger, it is necessary that a keener sense of touch be developed, owing to the fact that the little finger is the least sensitive of the fingers. One who has not developed this sense of touch may not be able to distinguish between the rolling motion of the condyle and the definite backward thrust. In some cases, this test is negative; for example, when there is a large mandible with small maxilla and there has been a broadening of the angle of the mandible away from the sagittal plane. The condyle in this instance develops to an inward inclination. I have seen such conditions return to normal, from the use of proper denture restorations.

In dental esthetics, let us remember that the mouth, teeth and facial contour, each separate feature, contributes to that composite which we call facial individuality. It is our first and highest duty to preserve this individuality, and it is equally important to restore it as nearly as possible when it is impaired. To attempt to make the face look younger or more attractive by making any one part of it appear younger than is natural is a great mistake, for the other parts suffer by an inharmonious contrast which always unpleasantly attracts attention.

Dr. Crawford, (closing): I was glad to hear Dr. Hartzell[7] and the men who discussed his paper, because it adds another point to what I was trying to bring out; namely, that these subjects are so correlated that each must involve the others, or you cannot base your technic or your result on fundamentals. Fundamentals must be the basis of every step in full denture construction. You must have a final object. You must have a proper beginning, and that beginning is based upon proper function as Nature intended it should be. We must learn to diagnose the abnormalities that creep in on account of arrested development through lack of function and correct those conditions as much as the age of the patient and the conditions will permit.

In answering Dr. Lowery's question, I believe here is another point that brings home the fact that we must know the physiologic condition of the patient and his habits before we can determine the degree to which we can correct the condition as we find it, because it depends on that patient's ability to return to normal or to accommodate himself or herself to the degree of restoration that we make.

Now I want to say that Dr. Hartzell's paper relates to dentistry, relates to full denture construction. Dr. House associated development with classification. Dr. Hartzell associated food and diet with function. If we are going to have dentistry take its proper place among the sciences, we must have biology, histology, embryology, anatomy and physiology, all inside of the dental circle, and they must so correlate that it will be one big subject instead of mere mechanics.

7. Hartzell, T. B.: The Philosophy Underlying the Processes of Nutrition, J. A. D. A., 11:33, (Jan.) 1924.

SOME PRESENT DAY PROBLEMS IN ORAL PROPHYLAXIS AND PERIODONTIA

By JOHN OPPIE McCALL, A.B., D.D.S., F.A.A.P., Buffalo, New York

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

DIVINE is that discontent which ever urges us on to reach that which lies beyond our present capacity, and which, the goal achieved, reveals to us yet another beyond the mark just set.

Those of us who have been in practice for twenty years or more will readily recall the problems which the dental profession faced in the early years of the twentieth century. The big problems of that day were the prevention of caries and the cure of what we then called pyorrhea alveolaris. One answer to the first problem was furnished by D. D. Smith, and oral prophylaxis, which he introduced to the profession, has been found to be a dependable agency for the prevention of caries. Therefore, to the dentist of twenty years ago, this problem might well seem to have been settled beyond need of further investigation. We, nevertheless, feel today that there are other answers to this question which may be even more satisfactory. And so the quest has gone on, with the hope that some means of controlling dental caries might be found whose benefits could be spread among those who could not command dental services as well as those more fortunate. Added significance has been given to this search by the recent developments in the field of focal infection. And this problem now is added to the older one.

The problem of what we now call periodontoclasia seemed even farther from solution twenty years ago than did the problem of caries. In this field, however, much has been accomplished; so much in fact that to the dentist of twenty years ago the accomplishments of the periodontist of today might seem all that could be desired in this field. Yet here, too, we feel that further advances can be made, advances that should to a large extent put the control of periodontal disease within reach of the individual, whether he is able to command expert dental service or not.

A summing up of the more important present-day problems relating to dental and periodontal disease may be helpful. Suggestions as to modes of procedure for their solution will be offered, but are to be understood as tentative only. The thought here is that we are perhaps not using all the agencies of investigation that lie ready to our hands. Many problems in prophylactic and periodontal research can be investigated only at the chair. And it is here that the study club may do so much. It is my hope that some at least of the questions suggested herein may be so studied and the results of the research published.

A problem that is popularly considered to be fundamental to the subjects of both caries and periodontoclasia is that of diet. No thoughtful person will deny that a correct diet is essential to the formation of sound dental and periodontal structures or that a correct diet will minimize the tendency toward the development of oral disease. On the other hand, we can hardly agree to the corollary, often stated, that a correct diet will prevent dental and periodontal disease. To agree to such a statement is to overlook the many factors beside diet that unquestionably affect the health of

the human mouth. That these other factors are important is attested by the results of investigations into the dietary as related to the presence or absence of caries and periodontoclasia. Reports of two such investigations have recently appeared in our literature. That by McDonagh[1] consisted of a compilation of replies to a questionnaire on diet as related to periodontoclasia. The total number of cases reported was about 500, and the fact that they were reported by dentists who are members of the American Academy of Periodontology gives the expectation of accurate observation. The cases were divided into groups according to whether the diet was rich or deficient in foods containing the various vitamins. Carbohydrates also received attention. Even those whose diet seemed to measure up to what is at present believed to be a satisfactory standard showed a high percentage of incidence of periodontoclasia and caries. McDonagh states that the report is of negative rather than positive value for this reason. It has, however, a very distinct value in pointing out that correct diet is only one of the factors to which attention must be paid. It also seems to demonstrate that we have not yet reached the end of our investigations into diet, at least as regards the human animal. In the field of the investigation of caries, we find a compilation by Rypins[2] on the incidence of caries as related to diet in children of preschool age. Here too figures occur which appear to controvert preconceived theories as regards the effects of carbohydrates in inducing caries and of fruit acids as a protective against caries.

Leaving tabulations for a moment, let us consider families in our individual practices in which the children brought up on essentially the same dietary fundamentals often exhibit the widest differences in dental susceptibility. In these cases, too, it can often be ascertained that the mother had the same diet during each pregnancy. Of course, we also see instances in which children under such circumstances have a similar susceptibility or immunity; which bears out the theory. But the former type of cases presents a striking anomaly.

Again, it has been a common clinical experience, for many years, to find susceptibility to caries prevalent at certain periods in life, these periods often being separated by long periods of more or less complete immunity. In these cases, we fail to find any changes in diet that will explain these alternating phases.

It will probably be urged that instances such as those just cited are too vague to have scientific value. When cited as isolated observations of individual dentists, this may be true. But they acquire weight if backed by statistics contributed by many dentists using uniform examination charts. Here the study club may render valuable assistance in the field of research.

The question has been raised as to the factors beside diet which enter into the etiology of caries and periodontoclasia. McDonagh, in his questionnaire, gave prominence to what he called "worry". Worry may be too restricted a term, but it at least is one of the phases of a condition of mental or psychic stress which has been noted by various observers as complicating many cases of periodontoclasia.

Generally speaking, more attention has been given to the various etiologic factors of periodontoclasia than has been the case with caries. Briefly, these agencies may be summed up under the headings of traumatic occlusion; mechanical irritation at or near the marginal gingiva; diet; systemic disease; abnormal metabolic conditions due to pregnancy, ab-

1. McDonagh, A. J.: Report of Committee on Scientific Investigation and Nomenclature of the American Academy of Periodontology, J. Dent. Research, December, 1922.

2. Rypins, R. F.: Studies on the Relation of Types of Diet to Dental Caries, J. Dent. Res. December, 1922.

normal living conditions, etc; hereditary tendencies; neuroses; functional insufficiency; bacterial activity, organic and inorganic poisons, and anatomic defects.

Each of these may be subdivided, and different cases may present an almost endless combination of two or more of these factors. It will therefore be seen that it is difficult to find any considerable number of cases in which the factor of diet presents the only variant. And it is only by citing several hundred such cases that we shall have worthwhile statistics on diet in periodontal disease. My thought is not to belittle the importance of diet as affording or failing to afford protection against periodontal disease. Nor do I wish to seem to belittle the work of such investigations in the diet of animals as that of McCollum.[3] But animals undergoing experiments in diet are subject to influences other than diet that are easily overlooked or when appreciated are difficult to control. Artificial environment cannot but have an effect on the general metabolism of even so adaptable an animal as the rat. The effect may be similar to that of shutting the human animal indoors, and subjecting him to the various other artificial influences that go with civilization. Whether there is such an effect it may be difficult to determine, but this possibility should be taken into consideration in drawing conclusions. Such comparisons will undoubtedly redound to the credit of man as an adaptable animal *par excellence.* For the conditions under which many human beings live and maintain a very fair state of health and fertility (one of McCollum's criteria of satisfactory living conditions) are such as it would be impossible to duplicate in effect in any humane animal research.

Let us, for example, see what the results of animal experimentation are as described by Grieves.[4] He warns against placing disproportionate emphasis on the absence of vitamins in deficiency diseases, as related to more important basic dietary factors, of which he cites calcium and phosphorus as examples. He shows the importance of all these factors and the effect produced on dental and periodontal tissues by varying their proportions, the effect including "caries-like defects" and "attaching tissue lesions." The percentages of lesions in the various groups of animals range from 17 to 31 per cent of caries-like defects and from 20 to 41 per cent of periodontal lesions. These figures are startling; but is it not equally remarkable that at least 69 per cent of the animals on these deficient diets failed to develop caries-like defects, and not less than 49 per cent remained free from attaching tissue defects? Think how valuable it would be if we could know why from 49 to 69 per cent of rats were immune to caries and periodontal disease. Obviously, diet is not all, even in the case of the laboratory animal, as Grieves himself states. Nevertheless, it is equally true that in the cases cited the deficient diet was probably the chief factor in producing these defects in a certain percentage of animals. It would therefore seem that to seek the dental millennium via the stomach is to invite disappointment. On the other hand, dietary improvement is an essential part of a program looking toward the improvement of the dental mechanism of civilized peoples.

This then is our problem as related to diet—to conduct dietary experiments on the human animal in such a way that all of the variables except diet shall be as far as possible eliminated. In the average American family, or in the average American dental practice, this is an impossibility. But institutions abound in our American communities, in which children of all ages live. These homes

3. McCollum, E. V.: The Newer Knowledge of Nutrition, New York, The Macmillan Co., 1922.

4. Grieves, C. J.: The Effect of Defective Diets on Teeth; J.A.D.A. 10:573 (July) 1923.

command competent medical service including dietary supervision, and many of them have volunteer or paid dental service. Assuming that uniform diets may be prescribed, how may the other variables be eliminated? That of differing hereditary influences may be eliminated by classifying the children as to nationality and as to whether their parents were foreign born or native. Further subdivisions may be made as to the susceptibility of the parents to dental disease. This information must be obtained from the parents, if either is living, as must also information regarding the occurrence of other diseases that might affect calcium metabolism. Physical classification will be required and also classification as to malocclusion and other oral abnormalities. The result would be a classification of the children in each home into groups whose reactions to a given diet could be tabulated as representing nearly uniform conditions. While the number in certain groups in one institution might be small, the combined tabulations of corresponding groups in all the homes in a given section of the country should yield figures of value. To carry on such an investigation would require the consent of the authorities in these homes and the cooperation of medical and dental agencies. We have in our profession such an agency already organized, the oral hygiene committees of our various state and local societies. There has been a vague feeling in some quarters that many oral hygiene committees have run out of material with the establishment of municipal and other paid dental dispensaries. If this is the case, an investigation such as is here suggested offers an opportunity for a most interesting and valuable work.

In the field of periodontia, there are several interesting and important problems presenting themselves. One of these has to do with the etiology of periodontoclasia. I have offered an explanation of periodontal etiology[5] in which it was proposed that periclasia was always caused by the concomitant action of two or more agencies. A further effort was made to adjudicate the relative importance of the various groups of factors, the opinion being expressed that traumatic occlusion and other mechanical factors were of primary importance, while systemic conditions were secondary. Diet was placed as secondary except when deficient in antiscorbutic vitamins. The opinions so summarized are still maintained. Systemic factors, while secondary to mechanical irritants, nevertheless assume a prominent place in the picture in many cases. Essentially the same opinion has been expressed by Bunting.[6] Evidence of major systemic complications is, in my opinion, based chiefly on the appearance of extensive periodontal lesions at an early age, i. e., in the twenties. In other words, the patient who has an average systemic defense against periodontoclasia will not develop deep pockets and perceptibly loose teeth under the age of 30, even in the presence of traumatic occlusion and other mechanical irritants.

Fortunately, we see comparatively few cases in which these deep lesions appear at or near 20 years of age. When they are observed, however, we may confidently assume the existence of some abnormal systemic condition. The fact that such cases are of so severe a local character, and so intractable in treatment, engages at once the interest of the clinician and of the researcher. What is the probable nature of this systemic condition? This is a question that many have attempted to answer, the most recent answers having to do with vitamin de-

5. McCall, J. O.: The Etiology of Periodontoclasia: Dent. Items of Interest 42:116, 1920; Stillman and McCall, J. O.: Text Book of Clinical Periodontia, Macmillan & Co., 1922.

6. Bunting, R. W.: Is Pyorrhea a Local or Constitutional Disease? Dent. Cosmos, July, 1922.

ficiency.[7] I have not found this a satisfactory settlement of the question. On the one hand, few cases placed in the so-called systemic category give evidence that there has been a pronounced vitamin deficiency in the diet at any time of life; while on the other hand, many individuals who have little or no periodontal disease, even at 40 years or more, have had throughout life a diet theoretically unsatisfactory. Furthermore, vitamin deficiencies produce profound and easily recognized systemic changes far overshadowing in severity the oral lesions; and these things are the exception in human periodontal disease. Moreover, I have been unable to observe any benefit in treatment through prescribing diets rich in vitamins. On the other hand, a few cases in which a preparation of cod-liver oil and phosphorus in malt was prescribed seemed to show improvement. This is suggestive, but is of little present value because used in only a small number of cases. But it is my belief that if any diet deficiency is associated in the etiology of periodontoclasia it will be most effectively counteracted through the use of cod-liver oil, which seems to be so rich in the antirachitic vitamin. An investigation by a study club or other group of dentists of the effects of cod-liver oil on patients developing deep periodontal lesions under 30 years of age should throw much light on this problem.

Systemic diseases of various types, intestinal putrefaction and stasis, and other more vague extraoral complications, have been suggested in the past as an explanation of the incidence of periodontal disease. It has been difficult for me to ascertain any decided differences with respect to these systemic conditions between persons developing pus pockets before the age of 30 and those who maintain a fairly healthy periodontium beyond that age, and who thus give evidence that systemic complications play a minor part in the etiology of the condition. In other words, these systemic conditions, which are often present and which undoubtedly have a part in the etiologic complex, seem to be of quite as secondary a character in patients under 30 as in those developing periclasia at a more advanced age.

Within the past two years, I have been interested in noting the tonsil condition in patients having well-developed periodontal disease and have so far found an invariable coincidence of well-marked tonsil infection and periodontoclasia. This has been especially marked in what might be called "precocious" periodontoclasia, that appearing in the twenties. In those cases in which the patient has consented to the removal of the tonsils, there has been a perceptible improvement in the tone of the oral tissues, and treatment has been more effective than in the cases in which the patient has refused to have the tonsils removed. Too few cases have been observed to permit the drawing of definite conclusions as to the part that tonsil infection plays in predisposing the periodontal tissues to infection. But the cases thus far observed have been so suggestive that I venture to recommend to some study club the compilation of statistics on this phase of periodontal etiology.

Another problem in the field of periodontology has to do with the discovery of the best method of securing the healing and reattachment of overlying vascular tissue to the tooth root after a pocket has been formed. For more than ten years, individual clinicians have observed cases in which they were able to obtain what was clinically demonstrable as a closing up of pus pockets by reattachment of tissue. These cases were few in number, and the operators, awed by Black's dictum[8] that such reattach-

7. Talbot, E. S.: Late Researches in Interstitial Gingivitis, Dent. Cosmos, 63:795 1921; Howe, P. R.: Diet as Related to the Prevention of Mouth Disease, J.A.D.A. 10:755, (Aug.) 1923.

8. Black, G. V.: Special Dental Pathology, Chicago, Medico-Dental Publishing Co., p. 185.

ment was impossible, hesitated to make public announcement of what they had accomplished, unless they could support their claims by histologic proof. Naturally, such proof was difficult to obtain, as patients who had received this benefit in treatment were loath to sacrifice the teeth in question on the altar of science.

It was once my good fortune to secure a reattachment and to see the patient at a later date when changes elsewhere in the mouth made complete extraction advisable. The tooth, a lower central incisor, was treated in 1911 for Miss S., aged 42, and the case was presented at a clinic in Buffalo in 1912. In 1920 after a period of neglect, the patient returned, and the tooth, with surrounding soft tissue, was removed under block anesthesia. Owing to late retrograde changes, the bone was entirely resorbed from around it and there was some inflammation. But much of the reattached tissue maintained its integrity. It was prepared and sectioned recently by Box, and the fact of reattachment was definitely proved.

What interests us now is the character of this reattached tissue. Before reporting the findings on this point, it is necessary to state what type of tissue is encountered in the periodontal lesion previous to treatment. On this point, Box[9] has recently made extensive studies, the result of which may be summarized in the statement that, in the majority of pus pockets, there is a nearly complete lining of unbroken epithelium on the crevicular surface of the gingival tissue. Ulceration of this surface, which has always been supposed to be the rule, is actually found to be the exception. In other words, as the pocket is formed, there is a constant tendency for the epithelium that originally covered the crevicular surface of the marginal gingiva to extend apically and thus cover the connective tissue that remains as bone resorption and pericemental destruction progress. This is an important point in itself, especially as it connotes a higher degree of protection against absorption of pocket contents into the circulation than has been held possible. This epithelial lining not only gives protection to the underlying soft tissue while pocket formation is going on, but it remains after treatment and can be counted on to give a still higher protection at that time even if reattachment does not take place. That it presents a problem in securing reattachment is attested by the sections of the tooth to which reference has been made. We find, in this specimen, that both epithelium and connective tissue have been reattached to the cementum surface. There has been no reattachment of pericementum, nor was any expected, since the pericementum with its characteristic fibers are destroyed as pocket formation takes place. New connective tissue fibers are formed but run parallel to the root surface instead of at an angle, and show no insertion in the cementum. Both epithelium and connective tissue prove the strength of their attachment to the cementum by withstanding the manipulation incidental to the cutting and mounting of sections without becoming detached. In fact, in one place, the epithelium is itself split parallel to the root surface, without pulling away from the tooth. Another proof of reattachment is afforded by the growth of a type of secondary cementum not formed under other conditions.

In the treatment of pericementoclasia (the type of periodontal disease in which pockets are formed), it should be our goal to secure a reattachment. It seems obvious, however, that when endeavoring to secure a reattachment, the presence of epithelium may be a hindrance rather than a help. In other words, it would seem that the reattachment of connective tissue to the cementum should be a more

9. Box, H. K.: Studies in Periodontal Pathology, Bull., No. 7, Canadian Dental Research Foundation, Toronto, 1924.

natural healing process than the attachment of epithelium, and one more readily attained. The problem presented for your consideration, then, is the devising of a method of removing the epithelium from the crevicular surface of the gingiva with a minimum of injury to this tissue. For some years, I have practiced and have taught in graduate instruction, the use of the curet scaler for the final stage of root surgery or apoxesis. This teaching was based on the belief that this type of instrument, because of its two cutting edges, would coincidentally freshen the crevicular surface of the gingiva and smooth the surface of the cementum, thus promoting reattachment. This operation has been attended with a very fair success which it seems proper to ascribe to the probable removal of a variable amount of epithelium during apoxesis.

Some years ago, Hecker[10] proposed the use of sodium hydroxid in the treatment of pericementoclasia, on the assumption that it would remove epithelium from the crevicular surface of the gingiva. This drug, if judged by its action on epithelium in other locations, seems not well adapted for the purpose. If we are to use drugs, the choice might better perhaps rest on sulphuric acid. But drugs in general seem unlikely to give satisfactory results. I have recently employed the actual cautery, using a root-canal dryer operated from the switchboard. It is kept moving gently in the pocket after turning on the current and is withdrawn when hot enough to cause pain. It will then be found that the gingiva at the orifice of the pocket is whitened. The use of a curet scaler afterward will result in the removal of a perceptible amount of tissue from the pocket. This also promotes a mild hemorrhage leading to the formation of a blood clot. Results have been very gratifying, and the percentage of reattachments has been higher than with methods previously used. This method may not prove to be the best one, but is suggested for trial by other clinicians. One word of caution should be given: neither the cautery nor any other method of inducing reattachment should be used until congestion is relieved, pus formation stopped and a visible improvement in local health secured.

One more problem in periodontology should be mentioned, that of focal infection. I have previously stated[11] my adherence to the view that foci of infection in the jaws or elsewhere may cause disease in other parts of the body. It is not necessary here to elaborate on or to defend the focal infection theory. There are problems in this field, however, which remain to be solved. In the first place, it seems that the evidence in favor of this theory has not yet reached such proportions as shall overwhelm some in our profession who continue to play the role of Doubting Thomas. These are becoming few in number; but when we add to them the large group of dentists who are puzzled by the conflicting views they see expressed in our journals, it will be seen that it is highly desirable that some super-proof of the truth of this theory be developed. Our literature is flooded with records of individual cases. Animal experimentation has supplemented the proofs of the clinic in a manner convincing to all but the irreconcilables. There remains one method of answering the question that has yet to be carried out in an entirely satisfactory manner. This method was suggested by Lee K. Frankel, Ph.D.,[12] an officer of the Metropolitan Life Insurance Company. He urges the use of statistics based upon examination of a large number of cases. The statistical

10. Hecker, F.: Pyorrhea Alveolaris, Michigan Dent. J. 1:120, 1916.

11. Stillman and McCall: Footnote 5, second reference. McCall, J. O.: Oral Diagnosis: J. Dent. Res., December, 1922.

12. Frankel, L. K.: A Consideration of Evidence of Oral Sepsis in Relation to Systemic Disease, Lee K. Frankel, New York Dent. Soc., Proceedings, 1923.

method is not new to our profession; but Dr. Frankel has made some valuable suggestions as to its use. Among other things, he urges the tabulation of cases of focal infection in which teeth have been extracted without benefit to the patient. In other words, he suggests that negative reports may be quite as valuable as the positive ones. This is unquestionably true, especially as the individual case in which extractions have been performed without apparent benefit to the health of the patient furnishes one of the most embarrassing situations in which a dentist may find himself.

As in the case of the experiments on diet suggested earlier in this paper, the statistics must be gathered under such restrictions of a diagnostic character as will make the findings valid. It remains simply to suggest in what these restrictions consist. In the first place, it must be ascertained that the patient is actually suffering from a pathologic condition caused by focal infection. Clinical observation and laboratory research have established a fairly definite list of these diseases; but the blood chemistry examination as interpreted by De Niord[13] gives the most reliable information as to whether there are foci of infection in the body. Statistics should be based on the use of this test as far as possible, and cases so examined should be tabulated separately from those in which the diagnosis is made by other means.

Having established the fact that the patient whose case is to be tabulated is a sufferer from focal infection, classification as to possible foci is made. It is absolutely necessary, if extractions or other oral surgical operations are to be performed, that the presence or absence of other foci of infection be determined. In other words, not only must we indicate foci in the jaws but we must also specify the tonsils, sinuses, appendix, intestines and genitals as being either positive, negative or doubtful, from the standpoint of infection.

A word of warning is in order here regarding the Wassermann test. I have seen cases having a history of syphilis in which the report of a negative Wassermann was given some years after treatment, and in which oral symptoms occurred that could be controlled only by injections of arsphenamin. As such patients may conceivably manifest systemic symptoms as well under similar circumstances, it would seem best to exclude from the tabulation patients having a history of syphilis, or to have injections of arsphenamin made in addition to the removal of foci of infection in such cases.

Regarding the tabulation of oral foci, every pulpless tooth, every tooth showing appreciable destruction of the parietal tissues or degeneration of the periapical tissues is to be tabulated as at least a possible focus of infection. In addition, edentulous bone areas showing abnormal cancellation or density of bone are to be regarded as possible foci; also impacted teeth wherever occurring. It will be obvious that oral examinations of the necessary refinement are only to be made by dentists having ample experience in diagnosis.

In tabulating the results obtained by the removal of foci, the completeness of their removal should be specified; in other words, no argument against the focal infection theory can be considered valid when based upon a lack of physical improvement following incomplete focal elimination. It has been my experience that more failures in the treatment of disease arising from focal infection are due to incomplete removal of foci than to any other one cause. For this reason, we must insist on the tabulation of all possible extraoral foci in these cases. Before concluding that any case is to be classed as failing to be benefited by extractions, etc., the blood chemistry should

13. De Niord, R. N., and Bixby, B. J.: Studies in Focal Infection, J. Lab. and Clin. Med. 7:573 (July) 1922; De Niord, R. N.: Blood Chemistry as a Diagnostic Aid in Focal Infection, J. Dent. Res. (Dec.) 1922.

be determined as a final check on the completeness with which the foci have been removed. Here, again, my experience has demonstrated the value of this test, with the result that many obscure foci have been discovered, and patients whose cases might have been considered as controverting the focal infection theory have been restored to health.

Another problem in focal infection has to do with the discovery as to what is going on in the systems of people who have patent foci of infection and who still present no subjective or objective symptoms of disease. If similar foci in other persons produce definite and serious disease conditions, is it possible for any individual to harbor these foci for an appreciable length of time without discoverable indications of an abnormal systemic condition? The blood chemistry in such cases should also give information of great value, especially if it were to show, or could be supplemented by other tests which might show, that the patient's health was being undermined or his susceptibility to other disease conditions was being increased. If information could be obtained on this latter point, it would add a very important chapter to the annals of focal infection. In this field, the statistical method again would be of value in providing tabulations of the cases examined. The methods of examination to be used, beyond the blood chemistry test already mentioned, may perhaps consist simply in a refinement of methods already in use.

It has come to my attention that a quantitative determination of uric acid may be made in the saliva, the suggestion being that this may satisfactorily supplant the blood examination as regards this substance. So far, I do not know that the parallelism of the quantity of uric acid in the blood and in the saliva has been established. If it is proved that it is subject to the same relative variations in both fluids, a much more economical and agreeable method of determining uric acid will have been found. That the salivary examination will entirely take the place of the blood examination is yet to be ascertained. The blood chemistry reveals much which is of value beside the amount of uric acid present, and it is uncertain as to how many of the substances to be determined can be satisfactorily analyzed in the saliva. Such examinations must naturally be made by those having complete medical training; but their bearing on the question of infection in the jaws makes them of prime interest to dentists. It is therefore to be hoped that groups of dentists will seek the cooperation of suitable medical institutions, the dentists furnishing the statistics on the mouth conditions of those examined. In this way, we may secure dependable information as to the behavior of these infections while in the latent stage.

In reviewing the foregoing problems, and the methods suggested for their solution, it will be realized that not only do these problems cover a wide field in the science of periodontology, but also the methods necessary for solution of most of them require the utilization of agencies which are collective rather than individual. Teamwork of a high order will be required, together with access to institutions of various types. Realizing the great benefits which will accrue to mankind when once these questions are settled, it is sincerely to be hoped that these investigations will be undertaken. Needless to say, I shall be glad to render to interested dentists or study groups what assistance it lies in my power to give, both in suggesting more detailed outlines of individual investigations and in carrying out any individual investigation that may be undertaken. For we are all urged on in the common cause by

> The thirst to know and understand,
> A large and liberal discontent;
> These are the goods in life's rich hand,
> The things that are more excellent.
> —William Watson.

Discussion

E. Melville Quinby, Boston, Mass.: Somewhat akin to the periodical migration of tribes in search of new pastures is the constant change in thought and practice in medical circles. So in dentistry we observe an almost bewildering series of changes in procedure in a feverish attempt to stem the advancing tide of disease. Furthermore, we must admit that the efforts of the dental professions have been so far singularly ineffective in the prevention of dental lessions.

General practitioners confess their inability to cope with the situation, except by the use of such empiric methods as are adopted by people in a low-lying country, whose only protection from floods arising from adjacent sea or river is by means of dykes or levees—whenever a crack or hole is observed in process of formation, some responsible person comes to the rescue and repairs the damage. But the *fons et origo* of destruction are still there; and constant danger is at hand. To guard these weak points, trained men are appointed, specialists in their work. Thus, in dentistry, many of us specialize in some branch of practice, and therein lies a possible source of danger; for a continual focusing on one angle of the problem tends to a narrowness of vision, perhaps toward losing sight of important factors. It is easy to criticize, more difficult to advise, but it seems, that speaking from the point of view of a general practitioner, the one preeminently essential factor in the successful practice of our profession today is the capacity for acquiring all the necessary data for a real diagnosis of each case. Undoubtedly, one of the most conspicuous examples of first aid in our attempts to take a sound view of the situation is furnished by the work of Dr. McCall. The chart entitled "The Etiological Factors of Periodontoclasia"[14] deserves the most careful study, and should be of the greatest service in dispelling the fog of uncertainty in which the etiology of periodontia is shrouded. In my opinion, it is the bounden duty of all students of these problems to study all the published work of Dr. McCall in connection with this subject.

In coming to a more intimate discussion of Dr. McCall's views, I must ask permission to revert to some of the statements in his previous publications, such as the "Clinical Periodontia."[5] In the chapter on etiology, we find one of the most impressive statements, e.g., the impossibility of any one factor being responsible for any form of periodontoclasia. In my own experience, nothing has seemed truer than that. It also seems most logical to assume that in a machine like the masticating apparatus, mechanical injury would be a potent factor in production of disease because impairment of functions is an inevitable sequel. After impaired function follow diminished vitality and resistance of the parts to pathogenic influence—so much is certain.

It may perhaps be permissible, however, to inquire whether there may not be some other condition equally important as a causative factor in periodontal lesions. In contemplating individual cases in my own practice, it is my habit to visualize the maxilla and mandible as parts of a machine, and ask myself what the essentials in forming a perfect mechanism are. Such necessary features are assuredly: (1) building up the parts in solid form; (2) making the parts fit in properly, and (3) keeping the parts clean so that rust will not appear and interfere with the function of the whole.

Translated into terms of teeth and investing tissues, we have: (1) nutrition, (2) occlusion and (3) oral hygiene.

This method has been of the greatest service to me, as it tends to compel a really inclusive study of the mouth as a whole, obviating a not uncommon tendency to dwell entirely on one feature of the case.

Considering the first essential—building up—it stands to reason and the research work of Dr. Percy Howe is very significant in this respect, indicating that if the subject has been the victim, from the earliest stages of development, of defective nutrition, the factor of frail osseous support of McCall and Stillman must assume, of necessity, a grave aspect in the etiology. Then again, Dr. Howe[15] has shown and is showing striking specimens (in guinea-pigs and, most important, in monkeys) of arthritis, decalcification of alveolus, softening and drifting of teeth, and some instances of actual caries (in monkeys), and in the living subjects (monkeys) gingivitis, alveolar abscess and eye conditions. These results are the more significant, as Dr. Howe points out, from the fact that the dentition of the monkey is in some respects superior to that of man, and therefore more difficult to disturb. The obvious deduction from these facts seems to point to defective nutrition as a very strong offensive factor. Goadby[16] claims that, while alterations of gingiva and change in composition of the bony element may occur through deficient nutrition, they are secondary factors, and do not account for the chronic infective nature of the disease.

Turning to the second essential, fitting of parts, the outstanding work of Dr. Paul Stillman in respect to traumatic occlusion needs no suggestion of amplification at my hands.

14. Stillman and McCall: Footnote 5, second reference, p. 49.

15. Howe, P. R.: Footnote 7, second reference.

16. Goadby, K.: Pathology of Gums and Oral Mucous Membrane, p. 97.

As to the third essential, oral hygiene, by this time it must be apparent to most of us that it is not good for the masticating machine to be clogged up with fermenting and putrefying débris of foodstuffs, with the long chain of attendant evils, mechanical, chemical and bacterial.

With regard to systemic diseases, I am inclined to agree with such writers as Dr. J. J. Sarrazin[17] that any disease tending to produce a local or general anemia must be reckoned with in the etiology of periodontal lesions—especially diabetes, interstitial nephritis and syphilis, if that function is impaired and tissue vitality lessened. We also recognize the fact that certain ages and conditions predispose to dental lesions, e.g., childhood, adolescence, old age, pregnancy.[16]

I would like to repeat that while the method of consideration of each individual case as outlined above has been of great service to me as a prelude to diagnosis, there has also been most indubitable evidence of a very complex and elusive etiology. It almost seems that in some cases, we have a vicious circle, commencing with a malocclusion or traumatic occlusion and ending with a periodontoclasia from defective nutrition.

Just here a practical case, seen, by the way, during the compilation of these notes, may be of interest, a woman, aged about 30 presented posterior teeth considerably filled; malocclusion, narrowed arches; rounded contour of marginal gingivae, especially of lingual areas of anterior; tendency to bleed, fair oral hygiene and traumatic occlusion, especially with regard to sup centralo, where bleeding was most marked. Her voluntary statement was that she had noticed repeatedly an exaggeration of symptoms when she was run down and in need of a vacation.

Certain other points in Dr. McCall's paper deserve much more careful attention than I can devote at this time, e.g.:

1. The suggestions of Dr. Frankel with regard to the compilation of more complete statistics with regard to results of treatment of focal infection—negative as well as positive. 2. A further consideration of Dr. McDonagh's report—though described as negative—on the question of diet as a factor in etiology. 3. The idea of forming study clubs to thresh out the pros and cons of the many problems in this complex etiology.

To summarize briefly: 1. There is need of a real diagnosis. 2. The masticating apparatus is a machine, and the essential factors in upkeep of a machine should be considered. 3. There should be a further and more insistent recognition of nutrition as a factor in periodontal lesions, as brought out especially in Dr. Percy Howe's research work at Forsyth Infirmary, on guinea pigs and monkeys, subject like man to scorbutic influences. 4. There should be a realization that systemic diseases producing anemia, local or general, are factors in etiology. 5. Study of the prevention of oral diseases should be a prominent part of the curriculum of dental schools, and other training establishments concerned in dental and oral instruction.

Julian Smith, Dallas, Texas: I am pleased that during this entire meeting we have heard so much in regard to the important question of diet in the treatment of periodontal diseases. The question of diet is one of the three important considerations, I think, which confront us in the treatment of this trouble. Apoxesis, properly performed, I would place first in the treatment of pyorrheal conditions; at the same time, cautioning against too much work on the roots of teeth. You may do more harm by overwork than underwork. If you injure the cemental structure, you cannot repair it. I consider proper apoxesis; proper correction of traumatic occlusion, and diet the three important factors in the treatment of pyorrhea.

My attention has been called to the question of diet more through a few individual instances among children than through periodontal troubles as we find them in older persons, but the correction of mouth conditions in children by attention to, and correction of the diet is very significant. I have had a number of cases among children from 6 to 12 years of age referred to me, with a decided ulcerative and swollen condition of the gums, where instrumentation was not indicated, on account of the extreme hypertrophy and ulcerative conditions present. The first thing I would inquire into was the diet, and invariably by changing the dietary we would get very favorable results. The inflammation would subside and ulcerative processes cease, and such instrumentation as was necessary could be instituted later. I have recently had a peculiar case of extreme ulceration, in a little girl of 6 years, who had all the symptoms of an advanced case of Vincent's infection, hypertrophy, deep seated ulcerations, sloughing, etc. Operative procedure was clearly impossible. The question of diet came to mind, and I called in consultation a child specialist who is well informed on dietary conditions. He told me afterwards that it was not a question of diet, but a case history revealed the fact that the child was inclined to be epileptic, and a nerve specialist had been giving her bromids constantly. There were two large ulcers on the breast and leg which had been treated by roentgen rays, without result. The presence of these ulcers aided

17. Sarrazin, J. J.: Pathology and Physiology of Interest to Dentists, J.A.D.A. 7:717 (Aug.) 1920.

the diagnosis, as they frequently accompany other symptoms of bromid poisoning. The bromids were cut down and the gums repaired, and the ulcers healed. This is interesting in connection with the question of mouth conditions and diseases as we find them.

There is one other thing I want to call attention to, and in this connection I shall refer to Dr. Stillman's paper, in which he alluded to the appearance of the end of the root, in fact, all around the apical region, where you sometimes find a thickening of membrane that you might consider a focus of infection. This thickening of the membrane should not be confused with a focus of infection until traumatic occlusion is corrected as it will frequently be found that the membrane will assume its normal condition after such procedure.

Arthur Merritt, New York City: One phase of Dr. McCall's paper should be emphasized as it is an epoch-making point in the history of periodontia, i.e., the question of actual reattachment taking place between the overlying vascular tissues and the denuded cementum. Dr. Younger, in 1892, before the Second District Dental Society of New York, stated he had clinically observed such a reattachment, and from time to time since, now over thirty years, men have been repeating this statement. Coincident with such statements other men, many of them prominent, particularly as histologists, have denied that such a thing could occur. Black, in his "Dental Pathology," states that a pus pocket once formed around a tooth is a permanent thing, and reattachment cannot in the nature of things take place. That has been emphasized on many occasions since.

Now we have proof that actual reattachment does take place, and all that is necessary is to recognize the forces of disease and remove them, in order to establish a condition which, for all practical purposes, may be said to be as satisfactory as that which prevailed prior to the initiation of disease. Periodontia, dentistry and humanity are indebted to Dr. McCall for the work he has been doing and which in this particular instance has cleared up a point that has been in question for over thirty years.

Dr. McCall (closing): Dr. Quinby's ideas regarding the necessity for diagnosis must always be kept to the fore not only in the thought of treatment, but also in investigation. We cannot investigate cases properly, unless we make a complete diagnosis of them. That point I feel I did not emphasize sufficiently in the preparation of this paper.

Dr. Smith speaks of diet and emphasizes this particularly in the cases of children who show inflamed conditions of the gingival tissues. I agree with him that in patients under the age of 20 or particularly under the age of 15 who show inflammatory and particularly hypertrophied conditions of the gingival tissues, the question of diet should be gone into thoroughly. It has been my experience, and I think this is made clear in the paper, that if the diet and other systemic conditions are satisfactory, the gingival tissues do not show any very pronounced involvement under the age of 20 years.

Dr. Smith's citation of the case of the patient showing gingival lesions due to the use bromids is valuable. I have had one case of a similar nature, but in a patient 25 years of age, with a decided hypertrophy of gingival tissues, deep pockets, etc. This patient was an epileptic and was almost constantly under the influence of bromids. He had ulcerations on the skin and a very intractable gingival inflammation and hypertrophy. I had to see him once a month to keep his mouth in anything like a satisfactory condition.

I wish to thank Dr. Merritt for his statement regarding the assertions of Younger on reattachment made so many years ago. I feel the question has been settled although I do not claim to have settled it myself, as Dr. Merritt may have led you to infer. It was my fortune to see one of these cases in which I had secured a reattachment, but which later got into a condition in which the teeth had to be extracted. I thus was able to get a tooth with attached tissue for study. In the case I presented, because of the neglect of the patient, a great deal of damage had been done. That may form the best proof of reattachment, because the reattached tissue maintained itself for nine years, in spite of neglect, a very fair amount of attached tissue being still left on the surface of that root.

Referring to a question handed to me relative to cutting away of gingival tissue, I may say that I do not cut away these tissues probably more than once a year. If we are expecting to secure reattachment of soft tissues to the tooth we should not cut any gum tissue at all. If, on the other hand, this is an error, then cutting is justified. I have been able to secure so many cases of reattachment since I entered the field of periodontia as a specialist that I have felt that cutting was never justified. And I do not believe it is essential, for sections show that the pus pocket will eventually be provided with a satisfactory epithelial barrier against the ingress of bacteria, even though we do not secure a reattachment. I believe in conserving as much of the gingival tissue as possible, so that the problem of the after-care of the mouth may be simplified to the greatest degree possible.

THE DENTIST'S RESPONSIBILITY TO HIS EDENTULOUS PATIENT

By ROBERT GILLIS, D.D.S., Hammond, Indiana

(Read before the American Dental Association, Cleveland, Ohio, September 10-14, 1923)

AN occasional diversion, a recess from consideration of technic or methods of accomplishing a given operative result is advisable.

The multiplicity of methods today finds all of us in a quandary when we seek the best methods for handling a given case. Dentists can be found who advocate one certain method and as many more are ready to condemn that method and offer a panacea in the way of another technic.

Without unqualified rejection of any of the novel methods offered in our increasingly voluminous professional literature, how may we be certain as to which advocate is right? Progress is desirable and inevitable—evolution is bound to bring changes in our methods. But when may we, as individual practitioners, discard the old and adopt the new?

Another question should first be asked and answered, and therein will be found a solution for the relative merits of the old and new methods: "How about the patient?" Just suppose that the relation of patient and dentist were reversed for the time being. You would certainly have a very personal interest in finding the proper solution of the problems involved.

A dentist's duty demands that he manifest just such an interest in every case that comes under his care. Is such an interest always exhibited? The answer is left to you as individuals.

There are dentists who appreciate their true position and value in the social economy. Others conduct their practice as if it were a thing related in no way to the community welfare, a thing isolated and unconnected with other human relationships.

Professional responsibility embraces not only technical ability but also professional conscience. No man so qualified and endowed will ever become a parasite on his community; and yet, we have dental parasites, those who fail to ask themselves "How about the patient?"

I would not be interpreted as rejecting any of the many modi operandi offered today.

On an equal plane of importance with the professional conscience as a prerequisite, there stands technical ability. By this, we mean a working knowledge of the several schools of technic.

Technical ability is not complete with a working knowledge of only one of the several methods known in our profession. We should be able to employ several recognized methods or combine their best features as the case in hand may require.

The several methods of denture prosthesis, for example, that are offered today are like the religions of today—each has its good points, each has its strong advocates, but none are universal and

none have any monopoly on successful attainments. Therefore, it is another preliminary duty that we be well acquainted with several methods of procedure because the diversity of problems in denture prosthesis often taxes the entire range of methods for a satisfactory result.

One should possess a mind that doubts and analyzes, but a will that constructs and believes heart and head should combine.

The patient presents for service a human being who has lost his teeth, handicapped in the race of life by the absence of essential anatomic parts.

Man may lose various parts of the body equipment with which Nature first endowed him and yet live quite comfortably. But no other portion of the human anatomy is lost in so many cases as is the dental. Dentists occupy a unique position in the social economy as replacers of these lost organs. And, owing perhaps to the frequency of such replacement needs, prosthetic dental substitutes can be had that more faithfully reproduce the lost natural organs than in any other field of prosthesis. Prosthetic hands, arms, legs, eyes, noses are to be had, but none of these function so faithfully as prosthetic dentures.

The loss of any part of the human body is to be regretted, but today the loss of all the teeth may be considered one of the minor losses, the lost of other parts being so much more nearly irreparable.

At the same time, we must admit that, of all dental patients, the edentulous patient constitutes our greatest problem.

So many functions are impaired when the teeth are lost, and yet no function is absolutely abolished. Mastication, insalivation, articulation, deglutition, respiration, facial ensemble and power of expression are those that are impaired. In addition, the edentulous patient is liable to suffer hindrance of the auditory and digestive organs and even subtle disturbances of the sympathetic nervous system.

Until very recent times, we have not recognized how greatly a person may be crippled by the loss of teeth.

I would acknowledge now the debt our profession owes to Dr. Monson for having called our attention to the grave functional disturbances that are so often the sequelae of the edentulous condition. He should be encouraged to study these conditions yet further, tapping every resource and applying every faculty with which he is peculiarly well equipped for this work.

First, being fully prepared and equipped for our work, and secondly, recognizing the dire needs of the edentulous patient, we are now ready to approach our case. Our next consideration should be a careful study and analysis of the foundation upon which we are to build. It should be borne in mind that no structure can be more stable than the foundation upon which it rests. Your patient supplies the foundation, which presents a dual aspect, mental and physical.

Dr. M. M. House has given the profession a basic classification under which we may determine the several components of the foundation, and I advise a careful study of his system of analysis.

Patients come to us in the hope of finding relief from an undesirable condition. Probably some previous patient of ours has directed the new prospect to our door.

Since this earlier patient (let us call him A) has already talked to the prospective patient (B) about his own case and there has been a mutual interchange of personal experiences, we are confronted with a happy situation wherein we can take the liberty of discussing A's case with B, in the chair. Talking to one patient about another patient is taboo in our office under any other condition than this. But here we have a

situation where no confidences will be violated and we can be free to discuss A's case along general lines of denture work. Of course, there are some intimate details of all cases that should not be discussed with a third party.

Nevertheless, this situation offers a unique advantage to the dentist. There is a psychologic triangle relating to A, B and the dentist. A has discussed his case with B and discussed the dentist with B; B has done likewise; so the dentist is now free to follow the same lines of discussion to create in B's mind a better understanding of the relative merits of his condition and incidentally arouse in him a desire to surpass the accomplishments of A's successful denture.

A careful examination of oral conditions is essential before we express any opinion to the patient. At the same time, we are busy making an analysis of the patient's mental attitude. Sometimes this is unfavorable. Until the dentist is able to overcome and eliminate doubt and pessimism from the patient's mind, he is not wise to proceed further with the case.

Right here one is called on to exercise keen diplomacy, suggestion, legitimate psychology, but above all things, one should avoid argument or direct persuasion.

With this class of patient, the first visit is crucial, decisive. A *faux pas* by the dentist at this stage is fatal.

Many dentists believe that such patients should be referred to another office. The occasional handling of such a case is a splendid training for any of us. It develops latent powers as easy tasks can never do.

With the more favorable mental conditions, our task is easier.

To all patients, the third responsibility is discharged at this early visit; namely, to afford the patient a true conception of what they may expect from prosthetic dentures.

Frequently, patients will come for denture service with the preconceived notion that another's success (or failure) with dentures is an indication of the measure of the success they may expect in their own case. In order to give the patient an idea as to what may be experienced in becoming adjusted to the new denture, we have found it to our advantage to use a little booklet which gives most of the essential points of our educational effort. We do not believe in painting a rosy picture at this stage; we would not promise much success or satisfaction until the patient has had time to learn to manage the new denture. One should promise less than the patient will probably accomplish, and when he finds that he is able to exceed expectations, he is encouraged to greater effort.

This instruction should not be interpreted as an effort at negation. All our effort is positive in its contemplation of the future. The patient should understand that he must experience a period of inefficiency before he can hope to attain success. There was a time, now irrecoverably past, when he enjoyed the high efficiency of natural teeth; and by his own persistent effort and with our help, he can again attain comfort and efficiency.

Our whole purpose at this stage is to prepare the way psychologically so that the minor difficulties which will probably come with denture wearing will not be considered signs of failure. As these expected difficulties are met and overcome, one by one, the patient notes improvement and is encouraged.

We are satisfied that the use of such suggestion or the employment of psychology is legitimate and advisable.

To paint a picture of success for our prospect and then pursue a course of endless explaining-away of difficulties in order to keep the patient in any way satisfied is not employing the power of suggestion wisely or legitimately.

Fully informing the patient as to what

he may expect thus becomes the third duty to the edentulous patient.

Up to this stage of the proceedings, the dentist has made no direct demonstration of his technical ability. He has simply matched personalities and mentalities with his patient and, if he has succeeded thus far, given equal technical skill, his final result will be satisfactory.

We are now ready to consider what most dentists would call the beginning of denture work. As can be appreciated, actual construction work is not the primary or initial consideration. All of us must consciously or unconsciously give pause to these preliminary considerations, or we shall fail in many cases.

The construction of a prosthetic denture may be likened to a book of many chapters: each step in construction is a chapter.

Our book may prove intensely interesting in the opening chapters but toward the end a circumstance related spoils the whole story.

I shall discuss technical details only to say that our denture construction may be divided into (1) examination and education, (2) impressions, (3) casts, (4) model making, (5) set up, (6) flasking, (7) packing and vulcanizing, (8) finishing and (9) adjustments.

When all of these steps are skilfully executed satisfaction is assured. If any one of them is carelessly done, the degree of success in the finished piece of work is lessened, and failure may result.

Men in general practice make most of the dentures that are worn today. They do best what they like to do, and seldom make a success of a piece of work that is distasteful to them. To some dentists, making dentures always appeals as being "dirty work"; they see nothing but meniality in denture work. Those so minded should always refer their edentulous patients to other dentists who are qualified to render real service in this line.

If we could take a census of all denture cases and gage the degree of their success, I believe we would find these patients, as a class, to be getting the least service of all. Many become adjusted to their dentures by time; others learn to manage their dentures until force of habit simulates a tolerable performance.

For such conditions no dentist needs be thanked; only by the perseverance of the patient can such conditions exist.

With the exercise of our best judgment and utmost skill in the construction of the denture, our fourth duty is performed.

We are now ready to place the dentures in the mouth.

At this stage, we again repeat and emphasize many of the points of our previous instructions. In our office, we make use of a little booklet, "A Message to Our Denture Patients," to assist in making the patient understand what is before him.

And how shall we know when we are attaining success?

By studying the manner in which the denture functions; gaging appearance, mastication and comfort. Opinions vary greatly as to what constitutes real dentures. In a recent class of twenty-seven men, this question was asked, and twenty-seven different written replies were the result.

Some of the ideas were crude and hazy, showing no comprehension of denture work. Perhaps they might be taken, however, as a fair gage of the idea of the whole dental profession.

By common acceptance, we are able to say that a man or a thing measures up well to what is recognized as *acceptable;* in other cases, the verdict may be *commendable;* and, in a few cases, we might even describe the attainment as *exemplary.*

In measuring the success of the serv-

ice we are rendering to our edentulous patient, we should check-up on results occasionally. What am I accomplishing for those who come to me for this service?

Will the verdict be covered by one of these adjectives? or might the verdict even be *dubious* or *objectionable?*

I should not be satisfied should either of these last two words measure my result; neither would I be satisfied if "acceptable," should designate the degree of success attained. My idea of success is described by nothing less than the word commendable and my ideal is not contemplated in any result less than exemplary.

With these ideas in mind, I have been developing what may be called a denture prognoanalysis chart.

By employing Dr. House's classification we are better able to diagnose our prospective denture cases. My conception is of something that will work both ways: it can be used in prognosis and also in analysis, as desired.

Working forward, it serves identically as does Dr. House's classification. Working backward, perhaps it will be of help to those who care to discover wherein they have fallen short in the ultimate result.

We will base our examination on: (1) foundation, that which the patient brings to us; (2) structure, the technical ability which we exercise; and (3) function, what the patient can accomplish with our help.

There is a base line or fundamental line above which each degree is favorable to success, positive, good, better, best; and below which each degree is progressively unfavorable, negative, bad, worse, wørst.

So every feature is either positive or negative; tending toward success or failure.

Dr. House has attempted to classify all conditions under just three heads. I would go a little further and divide both positive and negative conditions into three degrees of comparison.

FOUNDATION		STRUCTURE			FUNCTION			FEE	RESULT	
MENTAL	PHYSICAL	TYPE·SIZE·HUE	ARRANGEMENT	ADAPTATION	APPEARANCE	MASTICATION	COMFORT			
OPTIMISTIC	IDEAL	EXACT	HARMONIOUS	PRECISE	NATURAL	NORMAL	GRATEFUL	CASH	EXEMPLARY	+3
FAVORABLE	PROPITIOUS	CAREFUL	SHAPELY	COMPATIBLE	COMMENDABLE	SERVICEABLE	AGREEABLE	CHECK	PLEASING	+2
APATHETIC	RELIEVABLE	APPROXIMATE	STEREOTYPED	ADJUSTABLE	PASSABLE	AID	ACCEPTABLE	NOTE	TOLERABLE	+1
NEGLIGENT	OPERABLE	CURSORY	UNNATURAL	OVERCOMPRESSED	ARTIFICIAL	FEEBLE	VEXATIOUS	PART PAY	DUBIOUS	-1
DOUBTFUL	SOFT	INACCURATE	DISCORDANT	UNSEALED	FORBIDDING	AWKWARD	TROUBLESOME	PROMISE	OBJECTIONABLE	-2
PESSIMISTIC	DESTROYED	CONFUSED	DEFORMING	UNBALANCED	REPULSIVE	USELESS	PAINFUL	NO ARRANGEMENT	INTOLERABLE	-3

DENTURE PROGNOANALYSIS CHART

Under "foundation," we have merely amplified the classification of Dr. House.

We then give consideration to the part played by the dentist himself. His executive ability will vary from case to case; it would be ideal if he could do his best work in every case. But I have never met a dentist who claims to be such a master. In consideration of a group of dentists, the fluctuation in ability displayed would be still greater.

The determination of type, size and hue of teeth for a given case, the technical skill in impression work and subsequent laboratory technic, the artistic expression in contours, placements, finish, etc., would make a confusing graph if they could be recorded. And so would we find great variations should we try to graph the next consideration, function.

In this, both the dentist and patient take an active part.

In the matter of foundation or structure, either patient or dentist works quite alone; but now we find them working together for the best results.

In actual practice, if our graph could be one straight line extending right across the top section, conditions would be ideal and 100 per cent satisfying to everybody concerned.

As to "foundation, mental," 60 per cent of all denture patients could be included in the degree of —1 or +1 or +2; 10 per cent or less might be considered as +3 cases; and 30 per cent or more are in degree —2 or —3.

Of course, in the case of a patient of the degree —2 or —3, it is our first duty to analyze their difficulties and raise them mentally to a higher degree. I think there is little hope in any case in which I fail to improve the mental attitude before beginning actual operations.

Physical conditions presenting as —2 or —3 I consider the most unfavorable with which we have to deal. Such a patient may grade up to "favorable" mentally, but he should be well advised of the probable outcome so that a moderate degree of success shall score to the dentist's credit as "pleasing" even though the score under "function" should be no higher than feeble or troublesome.

In such cases, to whatever degree the "foundation" score falls below the basic line, the ultimate result may be raised above its normal ending.

Should analysis reveal a weakness under "structure," the dentist must look to himself as the cause and labor accordingly, not blaming the patient.

Should the analysis point to weakness in either of the "function" scores, either the patient or the dentist may be responsible. The dentist should proceed accordingly, but should give the patient the benefit of a doubt for a fair trial.

Sometimes I think appearance should be included under "structure"; but we know that muscle tone and contour and maxillomandibular relations change with constant wearing of dentures so I leave that consideration under "function."

Of course, this whole matter of dentures is based upon the presumption that the dentist has made proper preparation in himself for the work in hand. He must have developed personality, technical ability and artistic sense. He must be possessed of grit and common sense and not be afraid of hard work. He must have an understanding of the morbid mind (be a student of applied psychology); for the denture maker comes into daily contact with patients who are far below par.

Summary

The dentist should have:

1. A professional conscience.
2. Have technical ability; be conversant with several technics.
3. Realize and appreciate the condition of the edentulous patient.

4. Recognize advantages and hindrances presenting in the patient.

5. Afford the patient a conservative prognosis.

6. Exercise his best judgment and utmost skill in denture construction.

"Every man of initiative works in his own way, and the test is not whether he is doing the thing as you would do it but 'Is he getting results.'"

7. Cooperate fully in helping the patient past difficulties.

8. Check up on his results.

Discussion

Victor H. Sears, Salt Lake City, Utah: In considering the dentist's responsibility to his edentulous patients, there is one phrase which appeals strongly to me: "A human being has lost his teeth." In denture work, that is the way we should look at a case, and not merely as making a set of teeth for a mouth.

More and more, it is being realized that operations in the oral cavity have a bearing on the welfare of the patient aside from purely local considerations. There was a time when those who claimed that an improper root-canal filling might be responsible for pain in the knee joint were looked on as mentally deficient; the orthodontist was ridiculed for suggesting a relation between arch form and mentality capable of change in his hands, and the prosthetist was also greeted with derision for maintaining that impaired hearing might be the result of improper denture work.

Times have changed and will change more in the future. At this meeting you have heard case reports from Dr. Monson, whose ability and veracity are unquestioned, which call attention to new phases which the prosthetists must consider when a human being has lost his teeth. In addition to considerations of hearing, intestinal stasis, goiter and laryngitis, we should not be surprised to learn that a long list of abnormal conditions may result from unscientific denture construction.

This is of practical value to us as dentists because when a human being has lost his teeth we should not confine our efforts purely to placing substitutes in the mouth but should take a broad view of the factors in the patient's welfare. In a word, we should aim to restore normal form and function as we would wish it done for ourselves.

J. B. LaDue, Chicago, Ill.: There are no points upon which I can take issue with Dr. Gillis. I must commend theory, thought and method of application. I wish to lay stress on a few points, however. We all admit that the golden rule should be used in all our dealings with mankind. It is the application of the rule that sometimes causes us to stop and ponder. Do any of us in every instance know best the treatment that should be accorded us? Decidedly, no. We must leave part of it to the judgment of the persons serving us. We rely on their judgment to the extent that they have been able to impress us with the fact that their judgment is sound.

To the denture prosthetist who is sincere and whose life is in the work, the proposition of instilling into his patient that which results in confidence is the question. Such a man realizes that it is absolutely necessary that he make a deep study of all the methods of procedure so that he may apply the proper one to the case in hand. He must be a student of the variable personalities with which he must come in contact. Lack of mental harmony stands in the way of success even as much as physical difficulties. If our patients can be impressed with the fact that we appreciate their need of our services and that we stand ready to go to the extreme limit in doing all we can for them, even if the result is a failure we have the satisfaction of knowing that we have given our best effort. Occasionally, we have patients coming from other men for further service who will remark that "Dr. Blank certainly did the best he could and I have only the best of feeling toward him." This I consider a compliment; for even though technical knowledge was lacking the dentist was honest.

THE STATUS OF SODIUM CHLORID

By T. ANDREW BUCKLEY, D.D.S., New York City, New York

"And the Lord said, Escape for thy life; look not behind thee—but his wife looked back from behind him, and she became a pillar of salt."—Genesis XIX, 17-26.

Historical

IT WAS long before the time of Christ that salt was known and highly prized, both by man and the rest of the animal kingdom. It has been fought for and sought after from time immemorial, and it is the symbol of prudence and sincerity. Maurus Jokar, in the introduction to his novel Der Essbare Edelstein (The Edible Gem), says there is only one edible precious stone, salt. And this is the most precious mineral on earth. If we were obliged to choose between it and all the others, we should throw back into the darkness of the innermost earth the diamond and all varieties of the corundum, retaining only the salt, for without salt there is no life. "By the salt of the Prophet," is a common oath among the Turks. The Persians call an unworthy person "untrue to salt." Homer calls salt divine, and it entered in the sacrificial offerings presented to the deity, as well as playing a rôle in solemn ceremonials and covenants in ancient Greece. Religion and superstition, civilization and barbarian alike, deal with it as a bond or rite. Tacitus relates that the Hermunduri waged bloody war with the Chatti for over fifty years for the possession of the salt springs which were situated on the banks of the river Saale in Frankia, and in the neighboring forests; believing that such localities were closer to Heaven, and that the prayers of the mortals in these places were particularly apt to be heard. Much more recently, salt often formed a bone of contention for which wars were undertaken and crimes committed. Arthur MacDonald in "War and Criminal Anthropology," (Washington, 1917) relates that the extremes to which the rebels were reduced in the South, for the want of salt, are exemplified by the terrible shooting of Union men for seizing some salt which they could in no other way obtain.

It has been conjectured that some of the oldest trade routes were created for traffic in salt and incense, the chief economic and religious necessaries of the ancient world, and they play a great part in all that we know of the ancient highways of commerce. Thus one of the oldest roads in Italy is the Via Salaria, by which the produce of the salt pans of Ostia were carried into the Sabine country. Herodotus' account of the caravan route uniting the salt oasis of the Libyan desert makes it plain that this was mainly a salt road, and to the present day the caravan trade of the Sahara is largely a trade in salt. The vast mines of northern India were worked before the time of Alexander, and must have been the center of widespread trade.

On account of its valuable properties, salt was viewed as a symbol of permeating and cleansing strength, of wholesome fresh vigor and endurance, and as a means of preventing corruption. Hence the custom of rubbing newborn infants with salt, which persists to this day in many countries. The arabs entertain a

great and sincere veneration for salt. As in some other countries, a guest is received by them with the offer of salt and bread, and the covenant entered tacitly in this manner may not be broken. In Russia, the use of salt is observed in betrothal ceremonies. Among the peasants of Westphalia, among the Lithuanians, and in Prussia, salt plays a great part in their various customs and habits. So we also find in Portugal, Flanders, Ireland, Bigorra, in the Highlands of Scotland, it was used at birth, and also at a later date to safeguard the child. A more practical aspect of the virtues of salt is to be found in the fact that, both early in the history of the Roman army, and in later times, an allowance of salt was made to both officers and men. This "salarium" was, in imperial times, commuted into an allowance of money for salt, and still persists in our word "salary."

In the case of the Chinese, according to ancient documents, the art of extracting salt from sea water was discovered in 2700 B.C. By the year 100 B.C. the commerce in salt had become very important, and mandarins were appointed to regulate and extract the government tax on its sale. At the present day, there are in China thirteen salt-bearing districts, and with each is associated a district where its produce may be sold for the use of the people. In Borneo, no crime, however enormous, was refused, if by its committal the perpetrators could win the right to purchase salt at a reasonable price. And so in northwestern Borneo, "A Dyak once having eaten salt, can never do without it; this article tames a savage more than aught else, human or divine." The Manquianes, seminomads in the interior of Mindoro, in the Philippines, are very poorly provided with salt. Landor tells of their offering a boat in exchange for a handful.

In Central Africa, salt is much liked. It is an absolute necessity for existence in the negroes' opinion. It is put into porridge, and above all, in the relish eaten with the porridge or rice. It is obtained from the Miveru marsh, from Lake Chilwa, and the country west of the Shire. Lake Bukwa, in the North, is so brackish that it is quite undrinkable; to the West of the Matabele there are the great Makarikari and Ntwe Ntwe salt pans. Moreover, the natives burn grasses and plants and obtain a salt by lixiviating the ash. Livingstone, when travelling in this country, wrote: "Meat counteracted the bad effects of an exclusively vegetable diet. When the poor, who had no salt, were forced to live entirely on roots, they were often troubled with indigestion. We cured the disease by giving them a teaspoonful of salt. Deprived of salt for four months, I felt no desire for the condiment, but was plagued by a very great longing for the above articles of food. Milk or meat, in however small quantities, removed the excessive longing."

The Ba-Yansi tribe of the upper Congo regard salt as an indescribable delicacy. One man wished to exchange his wife for a moderate quantity; another was given a few pinches of salt, and immediately implored Johnson, the giver, to become his blood brother. The staple food of the Tans is the banana; they do not drink milk, but all eat some flesh once a day, and many twice a day. They eat fish, too, and the bodies of their slain enemies. They have a special word that signifies their craving for animal food, and they will suck salt as children do lollypops.

Physiological Effects of Salt

We find by studying physiological chemistry that on an ordinary mixed diet, a normal adult will daily excrete 10-15 grams of chlorid, expressed as sodium chlorid, in the urine. On a salt-free diet, this excretion decreases. If the diet contains an excessive quantity of

sodium chlorid, this excess will be promptly excreted in the urine. Normal feces contain very little sodium chlorid, even after excessive (sodium chlorid) ingestion.

Falk found that sodium salt may stimulate the rate of lipase action to a slight degree; the calcium salt always inhibits. The former shows no effect on the equilibrium point of the reaction mixture; the influence of the latter is such as to bring on this condition very much earlier than in the control lacking the salt. The inhibitory action of calcium chlorid is not due to the extraction of water from the medium by the salt. The inhibitory action of sodium chlorid was found to vary directly with the concentration of the salt, even in the presence of an excess of water. The concentration of sodium chlorid does not appreciably affect its influence on the enzyme action. The addition of NaCl reduces the inhibitory effect produced by the calcium salt upon both the rate of action and upon the equilibrium point. There is a definite antagonism exerted between the two in an enzyme reaction, and this antagonism is of a definite stoichiometrical order. It is probable that the effect of the sodium salt is not antagonistic in an opposite sense to that of calcium salt, but rather that the presence of the former tends to prevent the appearance of the calcium effect.

Dangers of Salt

The American Medical Association states in a report that Professor Rappin, Director of the Pasteur Institute of Nantes, recently read an interesting paper on the subject of "The Dangers of Table Salt" at a meeting of the Association Francaise pour l'avancement des Sciences, held at Strasbourg. Table salt can become the starting point of dangerous changes and fermentative processes, not only in industrial food establishments, but even in the kitchen itself. Salt does not inhibit the vitality of microorganisms, for the destruction of which it has been commonly used. Collected in a careless way, without special precautions, from mines and salt marshes, salt contains a great number of microorganisms capable of jeopardizing the keeping qualities of foods, to which it is added for the purpose of preservation. Experiments show that the anthrax bacillus resists the action of a saturated solution of salt for two days; the erysipelas bacillus and the streptococcus survive after a twenty days' immersion; the typhoid bacillus and the staphylococcus after three weeks; and the tuberculosis bacillus even after a three months' immersion. Only the colon bacillus and the cholera vibrio seem to be vulnerable. We can see here that salt may change the action of bacillus coli communis in the intestines of men and animals.

Even after cleansing in the ordinary processes of refining, salt contains a large number of microorganisms. Rappin has found, for instance, in a gram of salt, from 1300 to 38,000 bacteria and from 100 to 400 fungi. These figures are considerably greater if the examination is made on unclean or crude salt, and such salt was found to contain between 6,000 and 51,000 bacteria per gram, and in several instances, between 76,000 and 300,000, with the content of fungi varying between 150 and 700. Brines prepared for pickling contain even more microorganisms. In a sample of pork brine prepared two months before, the number of colonies on the eighth day reached a total of 960,612 per cubic centimeter. Professor Rappin thinks there is no doubt that when food industries use such unclean salt in butter and cheese, for example, they invite serious mishaps. From the point of view of hygiene, then, it would be desirable to employ, in the preservation of food products, no salt that has not been purified and divested of all bacterial contamination.

Medical Use of Salt

Sei I. Kivai cites various ways in which salt has been used in the medical world, but it is chiefly used internally or subcutaneously. As a solution, and in crystalline form, it has been used only in the treatment of wounds in ancient times. He has successfully employed it in recent years for the purpose of irritation, absorption of fluid, and improving the appetite.

Grumme presents arguments to prove that all mineral salts are not assimilated unless combined with albumin. This is probably true, with the exceptions of sodium chlorid and lime.

Allen states that in some arterial hypertension cases, the mere reduction of the overload of salt and water brings relief, which is comparable to the benefits of diet in diabetes. But the prolonged combination of excessive fluid and little salt possibly involves osmotic and eliminative difficulties which are responsible for the anasarca, pulmonary edema, and cardiac failure, sometimes described in connection with long-continued salt-poor diet. Salt abstinence is frequently advised in the treatment of hyperacidity, especially in cases of persistent hyperchlorhydria.

Scala's research at the Instituto d'Igiene of the University of Rome, demonstrated that sodium chlorid and sodium sulphate and phosphate, in contact with animal and vegetable colloids, form compounds from which hydrochloric or sulphuric acid dissolve out in relatively large amounts. The first two entail an acid condition; the compounds with the phosphate entail an alkaline condition. Under normal conditions, a balance is maintained, but otherwise, acidity or alkalinity may eventually predominate. The resulting disturbances form two great groups, one including pellagra, the other diabetes. Scala explains that improper diet or instability of the nervous system is the cause of the primary metabolic disturbance responsible for the upset.

Billings speaks of the stimulating effect which weak salt solutions have on the gastric secretion, especially in cases of plain subacidity.

Hayhurst cites the importance of salt containing iodin in goiter prevention. He states that all the manufacturing plants engaged in the salt industry are inland, except those along the California coast, where sea water is the source of supply, and here the process of evaporation frees it from iodin.

Bernandino Masei states that most patients subjected to a salt-free diet become quite accustomed to it by the end of two or three months. There is, however, an exacting minority, consisting of individuals in the cases of whom food without salt produces a loss of appetite, which prevents them from eating enough to give the organism the amount of nourishment it requires, and who therefore fall into a condition of torpor and feebleness. Moras claims that salt ages people and favors deposits in the blood vessels and joints. He further claims that salt is the most prolific cause of stomach, bowel, kidney, nerve, vital and sexual impairment, and aggravates catarrh and rheumatism. He claims that the excessive use of salt is bad for the reason that its habit so perverts the tastes that we swallow soups, meats and vegetables only because they are salty, and therefore we hurriedly swallow the mouthful or morsel in our wish for the next, with never a care of our bolting foods and gulping soups. No doubt this is true in a great many cases, and it is also true of the use of other condiments and spices.

Harris makes the statement that sodium chlorid is not an essential substance for the welfare of the human system. He cites that the death rate from nephritis and Bright's disease and heart and kidney disturbances has increased enormously during the last fifteen or twenty years, and it is a noticeable fact

that this increase has been much larger in the United States than in England. The reason for this may be that the English object to heavily salted foods; thus her hams and bacons are preserved with borax, and her butter with one-half of 1 per cent of boric acid instead of salt, though this does not agree with the table consumption of salt which I shall give at a later time.

Loeb describes the similarity of the action of salts upon the swelling of animal membranes, and of powdered colloids. He further states that when dry animal membranes, like pig's bladder, freed from fat by prolonged treatment with hot ether (a week or ten days in a Soxhlet apparatus), are put into water they will swell; they will also swell, and even slightly more so, when put into a salt solution; but when the membrane is put first into M/8 solution of NaCl for about one-half hour, and subsequently into distilled water, the swelling will be twice or three times as great as in either of the two cases. A further investigation of this problem suggested a possible connection with the structure of the membrane.

Deutsche Medizinische Wochenschrift says: "Salt is not the only factor in hydrops, but it is such an important one that removal of this link in the chain is one of the main points in treatment of nephritis with a tendency to dropsy.

Hurtz is strongly opposed to embalmed meats with their kidney-destroying saltpeter, their creosote and excessive amount of salt.

Armitage has written a very interesting book on "Diet and Race," and devotes a great part of it in describing the effect salt has upon the color of different peoples. He tends to prove that the more sodium chlorid consumed, the lighter the color of the skin. In reading his book one discovers some very peculiar customs associated with the use of salt. He states that unless certain salts, in certain proportions, are present in food, and in that form in which they occur naturally—except sodium chlorid and lime, which may be added as such—and unless these salts are present, too, in such quantities as will keep the salt content of the body at 1 per cent of its total weight, the food will be inadequate for body maintenance. There is no doubt that salt may be used to excess, but this is also true of anything else, not excepting the best and purest of foods, but soda and chlorin are necessary for perfect health maintenance. Armitage also finds that where salt or salt-containing foods are a luxury, the upper or wealthier classes will be fairer than the lower or poorer classes. He further states that there is no apparent reason why flesh or milk eaters should especially desire vegetable food; on the other hand, those who live on fruit, cereals or roots will keenly desire flesh or pulse, for both of these are rich in protein and salt.

Vilhjamur Stefansson informed me that while living on a diet of fish and meat he had no desire for salt. The following is taken from Chapter VI of his book "Hunters of the Great North": "But now I was face to face with a winter of nothing but fish—fish without salt or tea or anything else." "As to the absence of salt, that was due to an oversight. I had a subconscious idea that I could secure salt by boiling down sea water. At Shingle Point this was ordinarily possible, because the ocean was salty. I took potfuls of brine and boiled it down to a thick scum on the bottom of the pot. Thereby I learned some chemistry, for the taste was not particularly salty. It was rather bitter, for the sea contains a great many strong tasting substances besides ordinary table salt."

"Finally I was living on a 100 per cent meat diet, as did the Indians and Eskimos. I got to eating my meat and my fish raw. If you try it you will see that it helps a lot in making it easier to swallow. Each time I tried it I liked

it better and better, and eventually I got so fond of it that I agreed with the Eskimo, preferring raw to cooked meats and fish. Thus I learned to live as an Eskimo—on a diet of fish without salt."

It is recorded that Tennyson abstained from meat for six weeks, living only on vegetables. At the end of that time, when he came to eat a mutton chop, he said, "I shall never forget the sensation; I never felt such joy in my blood."

Bunge, looking at common salt from the physiological point of view, observed that the desire for this condiment was present in herbivores, but never in carnivores. He could see no reason for this since vegetable and animal food alike contain chlorin and sodium. He bethought himself of some chemical truths: if sodium chlorid be in solution, and potash carbonate be added, double decomposition will occur: potassium yielding some of the carbonate radical to the sodium, and taking, in its place, chlorin, hitherto combined with the sodium. Such a chemical change having occurred in the blood, the kidneys cause the expulsion of the sodium carbonate formed. In this manner, common salt, as such, is withdrawn from an organism by ingestion of potassium salts. "I have proved," says Bunge, "the correctness of this deduction by experiment. To a diet of uniform character, salts of potassium were one day added, the consequence being a striking increase in the excretion of chlorin and sodium. I have tried the experiment on myself with the salts of potassium, which are concerned in human nutrition. Eighteen grams of potash, as phosphate or citrate, divided into three does during the day, took up six grams of common salt from the body, besides two grams of sodium; for the potassium salts effect an exchange, not only with the chlorid, but also with the other compounds of sodium, as albuminate, carbonate and phosphate. The amount of potassium taken in these experiments was not large; in fact, it was much less than that introduced with the most important vegetable articles of diet, and yet six grams of salt were withdrawn from the organisms by it. This is about one-half of the common salt which is contained in the five litres of a man's blood. That other tissues likewise suffer by the loss is undoubted. But in the first instance, the blood is chiefly affected, and I believe that if this loss in the blood was covered by a comparatively small loss in the other tissues, a fresh addition of potassium must have the effect of producing a fresh loss of sodium." Bunge's investigation of the elimination of common salt from the human body led him to conclude that men living principally on a flesh diet would not desire the addition of salt to their food, and concluded that carnivorous man requires no salt, and he shows in how many cases investigations prove this conclusion correct.

Dental Uses of Salt

In medical literature of recent years has occurred repeated warnings of the harmful effects of excessive salt consumption, and it was this that induced me to inquire into the value of salt. From a dental standpoint, it has been chiefly used as a dentifrice and in solution as a mouth wash, and it is being extensively recommended by the practicing dentist of today, mostly in the latter form. Its use is still being advocated by schools of dental learning, and it has also been recommended as a means of sterilizing toothbrushes. Its influence over body nutrition and health, and especially its contraindication in hyperacidity should be taken into consideration by the dentist who considers the causes of decay and pyorrhea alveolaris of more than local origin. I will cite what one great dental authority says in regard to the value of salt used locally. Prinz, in his book on Materia Medica and Therapeutics, classifies the antiseptics as extremely strong, very strong,

strong, medium strong, and weak. Sodium chlorid is classified as weak, or at the bottom of the list of antiseptics.

It is difficult to find the statistics regarding salt consumption in various nations, but the following table is taken from Armitage, and, though not of recent date, its proportions are interesting.

This is in terms of pounds per head:

United Kingdom	80 pounds*
France	50 pounds
Germany	25 pounds
Russia	19 pounds
Austria	14 pounds
Italy	18 pounds
Spain and Portugal	17 pounds
United States	39 pounds
India	9 pounds

*Much salt is used for chemicals, manures, etc.

Conclusions

We find that salt is so universally and extensively used by man and beast, both in ancient and modern times, that it must necessarily be of great value, and although classed as a condiment, it is not to be considered in the class of other condiments and spices, as it appears very necessary to man's existence and well-being, especially while living mostly on an herbivorous diet.

Although salt will help form HCl, which is very necessary to digestion, it may readily be used to excess, and may hide the real character of foods eaten, and it may cause excessive stimulation of the appetite for food and drink.

Salt may be readily contaminated when unskilfully handled, and it may carry poisons and bacteria very harmful to the body.

The use of sea salt with its valuable iodin content is to be recommended.

Salt, being used for its antiseptic properties, is not very efficacious, and its use as a mouth wash or dentifrice is mostly mechanical.

It possesses great physiological value when used in transfusion, in the introduction of medicaments into the blood stream, and in the preservation of the vitality of cellular life.

In treating inflamed conditions of the oral mucous membrane, salt may reduce to a certain extent the congestion by exosmosis, and by stimulating the local capillary circulation.

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THE EFFICIENT DENTAL ASSISTANT

By JULIETTE SOUTHARD, New York City

(Read before the Plainfield Dental Society, Plainfield, New Jersey, October 10, 1923)

IN my study and observation of dental offices, which extends over quite a period of time, I have found that the average dentist gives a certain amount of careful thought and attention to the location of his office, and also to the general equipment thereof which will permit him to carry on operations to the best advantage (incidentally if he lacks in this respect, there is always an affable salesman who calls periodically and acts as a gentle reminder). He also pays attention to his personal appearance, having learned the psychology of personality and that a neat professional appearance is the outward manifestation of his profession. Recollection of individuals and the impression they make upon us is always coupled with their appearance, and patients are very keen observers.

Strange then, is it not, that, having spent years of valuable time in preliminary study to qualify as a practitioner of dentistry, following this up with careful thought in the establishing of an office and the efficiency of its equipment, plus personal appearance, the average dentist fails to consider seriously one of the most essential factors to his success, namely the proper selection of an efficient woman assistant. I use the term efficient, for to be efficient is to possess the knowledge of doing things effectually, and where should one's duties be performed effectually if not in the dental office?

Many articles have been written and published in the dental magazines within the past few years relative to the dental assistant and her manifold duties. I plead guilty to several, and I am not going to bore you with a repetition of those duties in detail but rather try to bring to you the justification for the growing sentiment that no dental office should be conducted without the assistance of a competent woman. This competent woman has been given many names. She has been called "the dental office manager" "the dental secretary" "the dental nurse" "the dental office diplomat" "the dentist's second right hand" the dentist's second brain and fingers" "the dentist's silent business partner" etc. What is in a name? Personally, I like to think and speak of her as the "Dispenser of Loyal Service" for nowhere is loyal service more to be desired than in the practice of dentistry.

First and foremost, the dental office should be clean. By this, I do not mean periodically clean, but constantly clean. Not only those parts of the office that the patient comes in contact with, but every nook and corner should be in perfect order, laboratory, supply closets, extra instruments and equipment, cabinet and desk drawers, etc. You all know the out-of-sight places in dental offices as

well as I do. Who can attend to the proper care of the office and see to it that it is always in order and thoroughly clean better than an efficient woman with her inborn ability for good housekeeping? The patient forms his opinion of the dentist and his work by the appearance of his office, and the sight of dirty floors, dust covered furniture, soiled linen, unpolished nickel, dirty cuspidors, trays of unclean instruments, etc., does not instill confidence in the mind of the man or woman of refinement. Clean and wholesome surroundings go a long way toward eliminating their fear of disease germs, and incidentally they will be willing to pay a fee more nearly commensurate with services rendered and will not hesitate to recommend that office to their relatives and friends.

It is understood that the average dentist expects to receive sufficient remuneration from his efforts so that he may enjoy a comfortable living, pay his debts and set aside a competency toward the possibility of a time when he may be unable longer to continue in active practice. Understanding this thoroughly, we figure that his time is valuable and should be conserved as all valuable commodities usually are. Who can conserve this valuable time by excluding interruptions, annoyances and worries with their detrimental influence on the skill of the professional service rendered? The efficient dental assistant will exclude the disturbing factors and their attendant waste of time; with tact, courtesy, alertness, willingness, patience, and careful attention to detail she will forestall those interruptions, annoyances and worries; she will know how to greet those who come to the office whatever their errand. The man who has something to sell will state his message to the courteous dental assistant, and leave his card, literature or samples in her care, and she, in turn, will call these to the dentist's attention at such time as he is not occupied. She will greet the patient who comes in with a grouch or a complaint, tactfully and with a smile. "A pleasant greeting turneth away wrath." Patients like attention, especially those who are suffering, and those who are nervous. A cheerful greeting, a pleasant word or two, assistance with their wraps and other belongings will go far toward toning down the tension of the moment, and the patient will be in a far more amenable frame of mind when called to the chair. Prospective patients who call to make an appointment can be nicely taken care of by the efficient dental assistant.

The telephone, another frequent source of interruption, can very well come under the jurisdiction of the dental assistant; with a smile in her businesslike voice, she takes care of all the calls and brings to the dentist's attention only those that are personal. Stock salesmen, real estate promoters, magazine solicitors, automobile agents and numerous others who use the telephone to peddle their wares can give their messages to the dental assistant, thereby saving much valuable time for the dentist. Garrulous patients who never know when to ring off when the dentist answers the telephone will state their message to the assistant and acquire added respect for the dentist when they are courteously told "Dr. Blank is very busy just now and regrets he cannot come to the telephone."

The dismissal of the patient and making of appointments can be taken care of by the efficient dental assistant; for she will recall the day and the hour that the patient prefers or at which they can come. To business people this means much. To a busy person, a reminder of an appointment by telephone call or card is greatly appreciated, and

incidentally broken appointments are a loss of remunerative time.

The efficient dental assistant can take full charge of the business side of the dental practice, caring for the books, records and statements, collecting all fees and giving receipts and in many offices writing all checks and banking moneys received, ordering supplies, etc.

The dental assistant is necessary as an aid to the dentist in his operative work. I shall not go into the details of the sterilization and care of instruments, linen, etc., and I am aware that many dentists do not want someone standing at their elbow every minute of the time. Nevertheless, I wish to emphasize that there should be a competent woman on hand at all times, one who understands first aid and can be of assistance in any emergency or accident. We do not anticipate these occurrences in the dental office, but they have happened and I am sure we are all agreed that no far-sighted dentist, alive to his welfare and reputation, should administer gas to women patients without a woman assistant in the operating room. The dentist should not have to waste time looking after crying children or hysterical women. These cases call for sympathetic consideration, and much precious time is spent looking after this type of patient. Many parents will not send their daughters to a dental office where there is no woman in attendance. This attitude of mind is growing, and the public is drawing comparisons between the offices in which there are dental assistants and those in which there are none.

I have touched only on the high spots of the duties of the efficient dental assistant. There are other phases of activity in the dental office in which she can prove of value, namely in the laboratory and the roentgen-ray room. I have shown you that she is housekeeper, hostess, trained nurse, secretary, telephone operator, bookkeeper, laboratory technician, and specialist on odd chores. I have also spoken of her as the dispenser of loyal service, and perhaps some of you are ready to ask the question "How are we to secure this loyal service?" I will answer "By the dentist being in turn loyal to his assistant." Forget that there has been such a person known to the dental office as "the office girl." Replace her with a "co-worker" who has sufficient mental capacity to understand that the success of a practice means her success, making her remuneration as large as would be paid in any other business for the same qualities.

It may be of interest to you to know something of the work being done by the Society for Dental Assistants in New York, of which I am president. About two years ago, this society was organized, to provide a means whereby dental assistants who are ambitious in their work could secure education relative to their duties. At present, there are no schools in the East giving training for dental assistants, and in too many of the offices the dentist has neither the time nor the inclination to train his assistant. We have provided classes in dental office accounting, roentgenology, gold casting, inlay casting, direct and indirect, model making and articulating in stone and plaster, mixing of cement and alloys, correct speaking and parliamentary procedure. Many prominent dentists and educators have given their services to the society and delivered lectures and essays before the meetings. Informal clinics have been held among the members, and at the close of the season in May, a group clinic of nine sections was presented at the meeting of the Dental Society of the State of New York at the Hotel Commodore. Many dentists have com-

mended our efforts and have been enthusiastic in their praises.

Recognition of the important part that dental assistants fill in the modern practice of dentistry is gradually spreading throughout the land. At Cleveland, many practitioners of dentistry, leaders in the profession, expressed gratification, and approval for the accomplishments of our society for dental assistants in New York and of other societies in the West. They gave their active support to the formation of a national organization of dental assistants along the lines and in sympathy with the American Dental Association.

I may say in passing that the preliminary committee was appointed at a meeting of dental assistants in Cleveland and there will be presented a plan, constitution and by-laws for a national organization at Dallas next year during the meeting of the American Dental Association.

It will be our endeavor to interest all dental assistants in becoming members of some local society in which they may have the benefit of the opportunity of meeting with others of their calling and a chance to join classes that will enable them to further their education in the detail duties of their positions. Our effort will be to raise the standard of efficiency of all dental assistants, teach them how to assume responsibility and above all make them understand that loyalty to the dentist and his profession is the only basis upon which they may hope to build a successful career.

Conclusion

May I urge you to sponsor the formation of a society for dental assistants from among the young women in your offices? You may think the number too small, but I assure you this is no drawback if their efforts are earnest and purposeful. In Burlington, Iowa, there are fourteen dental offices, thirteen of which are represented in a dental assistants' society, and in the past two years only one member has been absent from a meeting. If you will aid your assistants to increase their efficiency, you will reap the benefit.

If the dental profession is to achieve the high ideals that every earnest dental practitioner desires and is striving for, the service in the dental office should be coordinated to harmonize with those ideals. As the education and skill of the dentist advances, so should the education and the efficiency of his assistant advance. Service to humanity should be established on the highest plane possible, and this cannot be done if only a part of this service is carried out with intelligence and ability.

The Journal of the American Dental Association

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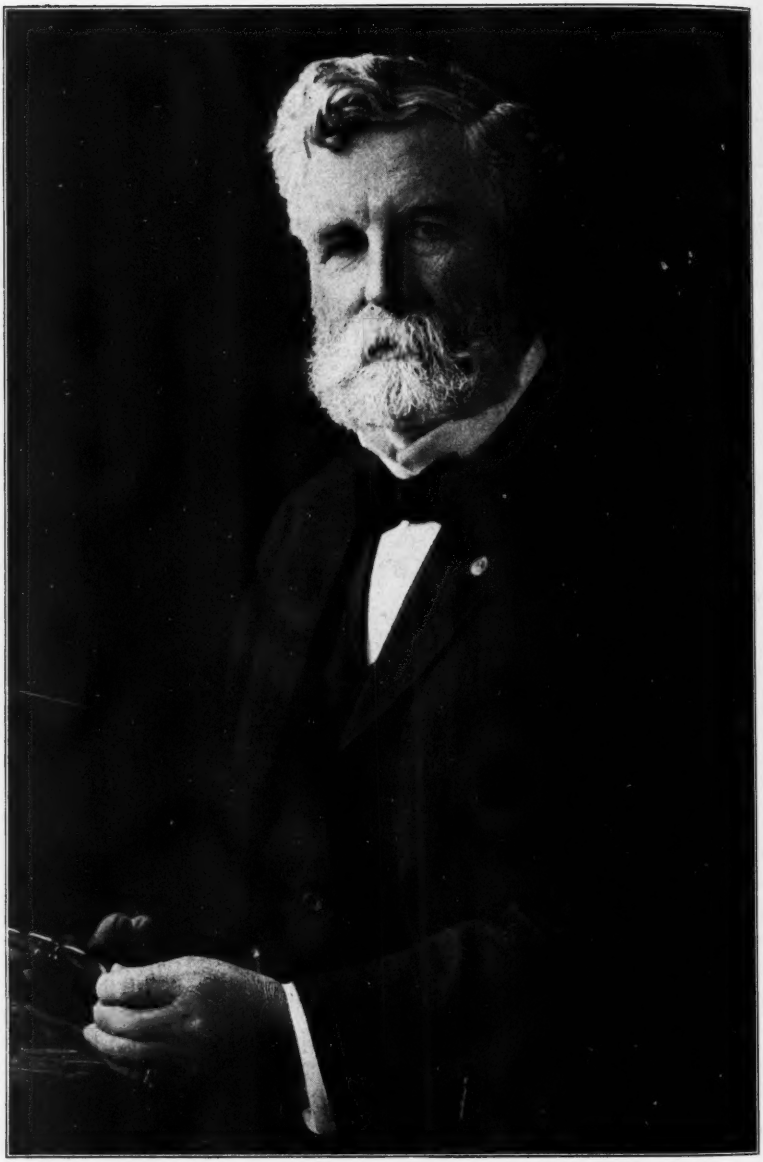
Editorial

THE 1924 MEETING OF THE FEDERATION DENTAIRE INTERNATIONALE

The International Dental Federation, which held its annual meeting in Luxemburg in August, is an important organization which should be better known than it is by the rank and file of our profession in all civilized countries. This representative international body, which functions in the interim between congresses in directing the affairs of world dentistry, has accomplished much for the benefit of the profession and humanity.

Representatives of the profession were present from France, Great Britain, Spain, Holland, Italy, Germany, Russia, Belgium, Sweden, Canada, Norway, Austria and America. Those from the United States were Drs. Truman W. Brophy, president, since 1914, of the Federation; Otto U. King, secretary of the American Dental Association, and of the Organization Committee of the Seventh International Dental Congress; Herbert L. Wheeler of New York, and H. E. Friesell and J. F. Biddle of Pittsburgh.

Practically one entire day was taken up with the consideration of the forthcoming Seventh International Dental Congress at Philadelphia in 1926, and many suggestions of great value were made as to its organization. In view of the long interim, caused by the war, since the sixth congress convened in London in 1914, and the rapid evolution in many of our administrative and educational problems, as well as in the various phases of dental practice, the coming congress calls for an unusual amount of devotion and energy on the part of the profession in order to bring to fruition its greatest possibilities. The dentistry of today is not, in many of its essentials, the dentistry of even so recent a period as 1914, and while there may be some argument as to what phases have advanced and what have retrogressed, all the various changes must at least be



TRUMAN W. BROPHY, D.D.S., M.D., Sc.D., LL.D., F.A.C.S., F.A.C.D., O.I., (French Republic), Chicago, Illinois

reckoned with and evaluated. And in this process of evaluation, the Seventh International Dental Congress must act as a clearing house to winnow out the worthless and preserve the valuable for the benefit of the entire profession. This should be the dominant thought in the minds of everyone interested in the real advancement of dentistry, and the profession of America in particular should begin active work at once to prepare for a meeting that should represent the best there is in dental science and art up to this date.

Dr. Aguilar, secretary of the Federation Dentaire Internationale, who had charge of the relief of Russian dentists under instruction of the Federation, a year ago at Madrid reported that he had already sent to Russia 380 sets of instruments; and he presented letters of the most profuse character from the recipients, expressive of their keen appreciation. In some cases, it was frankly intimated that the action of the Federation, supplemented by the generous aid of the dentists of the world, had prevented what would have otherwise resulted in actual want among our colleagues of Russia.

A pleasing incident of the recent F. D. I. meeting, and one of especial interest to Americans, was the award of the Miller Memorial diploma and medal to our own Dr. Truman W. Brophy, who has done so much not only for the Federation itself but also for dentistry generally and for the world at large. It seems altogether appropriate that Dr. Brophy's name should thus be perpetuated along with the distinguished men who have been the previous recipients of this honor: Dr. G. V. Black, Dr. Charles Godon and Dr. G. Howard Mummery.

In the same connection, it may be fitting to refer to the fact that, during Dr. Brophy's visit to France this summer, the French government bestowed on him the Decoration of Officer of the Legion of Honor. Coming as it does at the same time as the Miller award, it seems a fitting climax to a long and notable career in the service of suffering humanity, and we feel sure that the dentists of the United States will join with one accord in felicitating our distinguished colleague on his well-merited honors.

The next meeting of the Federation Dentaire Internationale has been set for August 5, 1925, at Geneva, at which time the plans for the Seventh Congress will be matured and systematized, and the details better worked out. It is, therefore, incumbent on as many men as possible from America to attend this meeting, and it is none too early to begin to plan for this trip. In view of the fact that America is to be host to the dental world in 1926, the time between now and then should be spent whole-heartedly in preparation for this great event.

First Annual Dinner of
Chicago & Cook County Dental Assistants
La Salle Hotel April 3, 1924

DEPARTMENT OF DENTAL HEALTH EDUCATION

ORAL HYGIENE IN HAWAII

By A. CLIFFORD BRALY,* D.D.S., Honolulu, T. H.

HAWAII was indeed fortunate when, through the generosity of one of her citizens, Mrs. George R. Carter, an endowment of $1,000,000 was given over to conserving the teeth of the children in this far-away territory.

The Honolulu Dental Infirmary was founded by Mrs. Carter as a memorial to her father and mother, Henry A. and Helen P. Strong of Rochester, New York. It was the wish of Mrs. Carter to establish a monument that would contribute to the health and happiness of all people in the Hawaiian Islands. In this institution, where the children of today and of the future may be taught the importance of dental hygiene, she has found the thing nearest her wish. Mrs. Carter chose to locate this memorial in Hawaii, rather than in Rochester, where the fortune which made it possible was accumulated by her father, because Hawaii is her home and will, she hopes, be the home of her children and her children's children.

The fact that Mrs. Carter chose to establish a dental institution instead of a museum, a library or a hospital was due to the overwhelming belief, based upon thorough investigation, that the greatest good could be done for humanity through the channels of preventive dentistry. After watching the results of the work of the Honolulu Dental Infirmary for three years, she feels that she has made no mistake.

In November, 1920, active service was started by the institution. At that time, only reparative work was attempted, one dentist and one dental hygienist carrying on the work.

During the first year, a survey of the mouths of the children in the fifth grade was made, and charts were filed for future reference. Dental and prophylactic work was started in the first grade.

Within the first year, it was learned that it would be impossible to cope with the situation by reparative work alone. To attempt to fill the teeth of 19,000 children in the first five grades of the city schools would be an endless task, and in five or ten years' time, conditions would be practically unchanged. A broader and more effective program was decided on—that of prevention in connection with repair.

Through the wise counsel of Dr. Fones of Bridgeport, Conn., a plan was worked out which constitutes the oral hygiene movement in Hawaii.

Requisites for an Oral Hygiene Program

A program for oral hygiene must consist fundamentally and primarily of means of educating the masses as to health habits, cleanliness and proper

*Director of the Bureau of Mouth Hygiene and Honolulu Dental Infirmary.

diet. This education must be given preferably to children, as little heed is given to it by the average adult. While it was realized that education as to diet should begin with the mother in order to have the greatest material effect on the offspring, little good would be gained, comparatively, by concentrating on adults at this time. Great emphasis has been given to teaching habits of oral hygiene, diet, etc., to the present generation, in the schools, in the belief not only that these children will be benefited, but also that habits will be formed that will be handed down through generations to come.

The above outlined program having been decided on, the big problem was how to execute it.

Since it was decided to concentrate on children, we obviously had to work out the program in the public schools. As we could not spend private funds in carrying out the program in the schools, the matter was placed before the legislature, and an appropriation of $20,000 was made for salaries and equipment for eight dental hygienists. This appropriation was made with the understanding that the Honolulu Dental Infirmary would train the girls and that the work of the hygienists would be placed under the department of public instruction.

TABLE 1.—REPORTS OF DENTAL HYGIENISTS AND HONOLULU DENTAL INFIRMARY

Sept. 1, 1922—June 1, 1923

No. Patients	Average Age Years	No. of Cavities Temp.—Perm.	Fistulas	Mal-occlusion	Without Toothbrush
6,249	9	34,128 38,064	1,656	2,129	851

Average number of cavities per mouth 11.5
Average number of fistulas or abcesses per mouth 3.75

Sept. 1, 1923—June 1, 1924

No. Patients	Average Age Years	No. of Cavities Temp.—Perm.	Fistulas	Mal-occlusion	Without Toothbrush
5,366	7½	21,181 22,844	1,395	1,348	855

Average number of cavities per mouth 8.2
Average number of fistulas or abscesses per mouth 3.84

Prophylaxis should be given at regular intervals. Prophylaxis *per se* helps to save many teeth, but, like reparative dentistry, it would be a never-ending task and would result in very little material aid in a program of prevention unless accompanied by educational talks and toothbrush drills, and the establishing of good home habits in the care of the teeth. But along with the educational work, actual cleaning of the teeth serves to emphasize the advantages of clean, healthy mouths.

As repair of decayed teeth and the treatment and care of diseased conditions in the mouth will always be necessary, a repair clinic must be maintained.

A school was then organized; men of dental and medical professions were employed as teachers, and a trained dental hygienist from Dr. Fones' corps in Bridgeport, Conn., was brought down to supervise the work. A call was made for Island girls to train for the work, the privilege being given them to take the course free of tuition provided they served in the public schools for at least one year. Twelve girls responded, and the required number were trained, passed the examination given by the board of dental examiners and began their work in the schools, in September, 1921.

The girls were sent to different schools

on all the Islands, where their work was received with such enthusiasm by all school authorities and people in the districts in which they worked that a further appropriation was made and a second class was trained. This appropriation provided for twenty dental hygienists. Sixteen of these are now in the service and four more will start in September of this year. Being under the department of public instruction, they are classed as teachers. Their classroom work, which extends through the eighth grade, consists of carefully prepared lectures and regular classroom instruction, including toothbrush drills. They also do prophylactic work for every child in the first three grades. A chart of each mouth is kept on file. With the present corps, it is impossible to treat each child in the first three grades more than once a year, but we hope to be able to double the number of hygienists in the future; which will insure each child prophylactic care twice a year.

The results of the combined efforts of the dental hygienists in the schools and of the dental repair work of the Honolulu Dental Infirmary are better shown in Table 1.

There has been a decrease of 35 per cent in the number of cavities in the two years. The number of fistulas is slightly increased. This is due to the large increase of first graders, only one-sixth of whom we have been able to attend.

Centrally located in the City of Honolulu is the Honolulu Dental Infirmary, where dental repair work is done for the children. At present, five full-time dentists are kept busy, averaging seventy-five patients each day. The daily average at the clinic as to grades is about 60 per cent first graders or new patients and 40 per cent "come backs" or those who are scheduled for rechecking every six months. At the present time, the comebacks require only half an hour in the chair; and when we compare this period with the three to four hours needed to complete the work on a new patient, we know that the dental hygienists are working well and the dentists at the infirmary are doing work of the right quality.

Table 2 shows the amount of work that was accomplished last year.

Our social service worker is kept busy checking the financial status of the families represented by the children who need dental care.

The institution uses every effort pos-

TABLE 2.—WORK OF HYGIENISTS AND INFIRMARY DENTISTS

Operations—Clinic

July 1, 1923—June 30, 1924

Total number of visits 14,252

Operations	Fillings	Treatments	Extractions	Roentgen Ray
Permanent teeth	10,456	1,894	1,471	272
Temporary teeth:	3,435	420	6,620	
	13,891	2,314	8,091	272

Anesthetics

Nitrous-Oxid	605
Procain	2,983
Chloroform	1
Ethyl-Chlorid	26
TOTAL	3,615
New Patients	2,248
Comebacks	2,215
Individual Patients	4,463
Completed Cases	2,564

sible to prevent enrolling in the clinic any child whose parents are able to have the work done by a private dentist. This prevents pauperization of the community and interference with the clientele of any private practitioner.

When children have been found eligible for treatment, they are sent in groups from the different schools to the Infirmary. During the first year and a half, it was necessary to transport practically all of them; but the location of the Infirmary building has become so well known that no transportation or chaperonage is now necessary. First graders are generally conducted by an older boy or girl who is scheduled to come at that time.

School teachers have cooperated splendidly. Appointment cards are sent from the Infirmary to the principal of each school. She, in turn, distributes them to the teachers of the different rooms, and they assume the responsibility of sending the children to the Infirmary at the appointed time. The program links into that of the schools so well that eligible children meet their appointments for dental work as happily and promptly as they do their classes.

I believe that the success of the Infirmary has been due to a great extent to the cooperation of the school authorities.

A new building is now being planned to house all departments of the work including reparative dentistry, orthodontia, and necessary prosthodontia. Twelve chairs will be installed in the main operatory and two in the orthodontia and prosthodontia departments. There will also be well equipped extraction rooms, roentgen-ray and photo rooms, a large lecture hall and facilities for the hygiene school. The building will be two stories, the upper floor being used entirely for clinical work and the lower floor for administration, library, children's waiting room, etc.

The program should be increased 50 per cent in all departments within the next two years. This means that there will be one dental hygienist to approximately every 1,500 children; which will enable each child to have prophylactic treatment twice a year. The educational work will be increased, and a more complete check will be kept on each child. Under this plan, a child will be treated twice each year by the hygienist and the dentist. More time can be given to prenatal hygiene and infant feeding.

An ideal program is to have all children pass from the fifth to the sixth grade with mouths in which the teeth are properly repaired, cleaned and free from infection. This is the goal toward which the Honolulu Dental Infirmary is continually striving.

"COMMUNITY ORAL HYGIENE"

In the series of public health studies issued by the New York Association for Improving the Condition of the Poor the latest to be published is "Community Oral Hygiene," a report of a four-year demonstration that the Association has been conducting in the Mulberry district of New York City. In a foreword to the report, Bailey B. Burritt, general director of the Association, says:

> Communities are only beginning to awaken to their responsibility of providing a complete preventive dental program for school children. New York City in common with most communities has lagged behind Bridgeport, Boston and Rochester in providing an extensive dental service for school children. In order to promote this important work, the A.I.C.P has undertaken an experiment in an oral hygiene program for the children in the Mulberry district, in the hope that the results of this experiment might lead New York City and other communities to provide an adequate dental service for school children on a permanent basis.

The report, which was prepared by J. C. Gebhart, director of the Depart-

ment of Social Welfare of the Association, points out that it was agreed at the outset that such a demonstration would be most significant if it were confined to children, particularly young children, and if the emphasis were placed on educational and prophylactic work. In general, the policy has been to adopt those features of the work in Bridgeport and Rochester that were suited to the situation in the Mulberry district.

The following steps, arranged in the order of their relative importance, were deemed essential to the program:

1. Prophylactic cleanings at least once a year, and twice a year if possible, for all children in the first five grades of school.
2. Extraction of unsavable and diseased teeth, in order to put the mouth in a hygienic condition.
3. Prophylactic fillings (to prevent decay) in all first permanent molars, and reparative fillings where needed in first molars.
4. Nitrate of silver treatment to arrest decay in deciduous teeth that are retained longest.

The fourth point, that of providing nitrate of silver treatment for temporary teeth, was added later after experience had clearly demonstrated that the treatment of the decayed surfaces of such teeth with nitrate of silver was sufficient to arrest decay and to enable the children to retain them for the proper length of time without imposing the unwarranted expense of placing permanent fillings in teeth about to be shed. While the procedure outlined above was drawn up primarily for school children, it has been followed also in the work with children of pre-school age.

The work was first begun, October 1, 1919, in one of the public schools of the district, with a full-time dental hygienist installed in the kindergarten room. The following January, a dentist was secured on half time. By June, 1920, this work had developed to such a point that a well-trained dentist with broad vision and executive ability was needed to develop the work along sound lines and to keep the staff inspired in their task. The staff now includes, besides the supervisor, two full-time dentists and two half-time dental hygienists.

The plan has been to concentrate efforts in the schools where no work has been done and where work may go on from year to year without interruption. In this way, there was definite assurance that the work was being done where it was most needed and where the continuity of the service would enable the Association for Improving the Condition of the Poor to secure tangible results.

An extension of the service to pregnant women was begun in February, 1922. By selecting a limited number of pregnant women, preferably those in their first pregnancy, for intensive dental care and instruction in diet and oral hygiene, it was hoped that the mothers would be encouraged to begin early in training their children in the care of the mouth.

The actual improvement in mouth conditions is best shown in the annual survey made by the Association supervisor for the purpose of determining in advance the amount of work needed during the year. The children are classified as to those needing extractions and fillings of various kinds and those who need no reparative work. Since the survey is not made at exactly the same date each year, this picture is obviously not altogether reliable; for if the survey is made quite early in the school year, before much work has been undertaken, a much less favorable picture is given than if it is made later, after many of the worst conditions have been cleared up. In spite of these variations, the annual classification of the children shows a steady improvement.

The Association has now made four annual surveys of the mouth conditions

of the children of Public School 106, where the most intensive campaign has been conducted. The increase in those needing no corrective dental work and in those awarded diplomas for having kept the mouth clean has steadily increased. There has also been a marked reduction (from 85.4 to 46.4 per cent) in children requiring fillings, for the most part in first permanent molars. While the proportion needing fillings is slightly greater than last year, the proportion needing extractions has been reduced from 40.3 to 32 per cent. This is again a most encouraging sign, for it means that more children have savable teeth than last year, and for such, fillings rather than extractions are indicated. There is also direct evidence that the fillings required are of a far less extensive nature than when the work first began. In 1920, 60 per cent of the fillings were urgent; in 1923, only 37 per cent were urgent.

While approximately 3,000 children have been served annually through the dental clinics, approximately 1,200 of this number received intensive care, including extractions, fillings and treatment with nitrate of silver. Obviously, the per capita cost for these 1,200 will be much higher than the per capita cost of the total 3,000 served. The practice has been to divide the total annual expenditures by the total number of children reached, in order to secure the gross per capita cost. Thus, for the first year that complete records were available, the gross per capita cost was $4.17. This item, however, included several expenditures for equipment and educational literature. By the following year, the per capita cost had been reduced to $3.79.

The reduction in cost is due both to an actual decrease in the amount of corrective work to be done and to the fact that a larger number of children were reached through the prophylactic service, in which the cost is less. During the last year, the per capita cost had increased to $3.99. This increase is due, in part, to extending the service to children of pre-school age. This at first, involved considerable loss of time because of unkept appointments. It seems reasonable to conclude that a dental service of this kind cost approximately $4.00 for each child. The Association also presents in its report the approximate average cost of particular operations, prophylactic cleanings, fillings, extractions and treatments with nitrate of silver.

There are, indeed, few health services, the report points out, that for an average annual per capita expenditure of $4.00 can show such unequivocal and far-reaching results as those accomplished by this demonstration. The full implications of these results will not be fully realized until oral hygiene is accorded its proper place in preventive medicine. The increase in clean, healthy mouths, the saving of first permanent molars and the reduction in the incidence of dental caries have proceeded during these four years at a rate little dreamed of when the work was begun.

The demonstration has proved that a dental service which is administered as an integral part of the daily school program produces the most widespread and lasting results. Experience has shown that when the dental clinic is in the school building, children can be sent directly from the classroom to the dental clinic with a minimum of waste time as regards both pupil and operator, and with a minimum amount of confusion and disruption of classroom work. The hearty support and cooperation of the school officials in promoting the educational aspects of the dental program could hardly have been secured if the dental clinic had not been in the school building.

EDUCATIONAL MATERIAL NOW AVAILABLE

Public health is the foundation upon which rests the happiness of the people and the welfare of the state—DISRAELI.

Public health, with its economic, physical, mental and moral phases, should be the concern of every citizen. Especially is this true in the case of the dentist; for the ill-health of the oral cavity is one of the biggest public health problems of today. Could not every dentist, therefore, do his share to contribute to the happiness and welfare of the people in his community by introducing dental health facts into the schools and at meetings of the laity?

The Department of Dental Health Education offers the following educational material.

SLIDES FOR SCHOOL USE

Many schools are equipped with stereopticons; or some local organization or individual may have one that might be borrowed for school use. Most school nurses and school teachers are anxious to secure slides on mouth hygiene to show to their pupils. However, few know that such slides can be rented from the American Dental Association. Here, the dentist may act as the connecting link—the public health interlocutor.

"Your Teeth," a set of forty-eight slides, issued by the Massachusetts Department of Public Health, may be rented for $1.00 a day or $5.00 a week.

"Johnny Don't Care's Teeth," a set of colored slides, produced by Dr. W. E. Kleinschmidt, executive secretary of the Toledo Public Health Association, may be rented at the same rates.

SLIDES FOR MOTION PICTURE HOUSES

In many communities, dentists have interested managers of local motion picture houses in showing a slide or two with pithy dental slogans between films. As many other dentists would probably be interested in a similar undertaking, the Department offers the following list of slides, from which five may be selected for $1.75.

1. Prompt attention to decayed teeth saves money and suffering.
2. Do you visit a dentist twice a year or do you wait until your teeth drive you to him?
3. The grinding power of sound natural teeth is about 350 pounds; of artificial teeth about 25 pounds. Why don't you save your teeth?
4. Decaying teeth spell dyspepsia. Diseased teeth and unclean mouths are the most frequent cause of indigestion. Chew your food well. The stomach has no teeth.
5. Watch your teeth. (Sketch of lighthouse).
6. "Proper care of the mouth and teeth is one of the most important of all the measures that are taken for the protection of the human body, and a failure to give them care, is, in my judgment, the direct cause of more disease in the human family than any other single cause."
   MAJOR W. W. OWEN, M.D., *Surgeon, U. S. Army.*
7. From a health standpoint, it is more important to brush the teeth after each meal than to wash the face on rising.
8. If you have bad teeth and cannot chew your food properly, indigestion results and your health suffers.
9. Arthritis, heart trouble, rheumatism are prominent symptoms of bad mouth conditions. There is prompt relief in correct dentistry.
10. You need never lose a tooth.
11. Decaying teeth do not permit of perfect mastication; imperfect mastication is the open door to malnutrition, and malnutrition is one of the greatest factors in all diseases. Clean teeth do not decay.
12. Pyorrhea is the cause of the loss of more than 50 per cent of all the permanent teeth that are lost from any cause. The slow insidious nature of the disease results in its presence usually not being suspected until considerable irreparable damage has been done and often not until many teeth are practically lost. Pyorrhea can be prevented by keeping the teeth clean and it can be cured if not in an advanced stage.
13. There are ten million school children in the United States suffering from the direct effect of decaying teeth and insanitary mouths. Is your child among them?
14. Neglect of the temporary teeth means crooked and rapidly decaying permanent teeth. Sound teeth properly used will result in good health. You save money; today's small filling saves tomorrow's large filling. How about your child?
15. As a result of bad teeth and insanitary mouths, the physical development of the child

is seriously retarded. The more the physical development is disturbed, the less in general is the mental capacity. The worse the teeth, the worse, as a rule, is the school standing.

16. "On account of bad teeth, the physical development of the child is seriously retarded."

"The more the physical development is disturbed, the less, in general, is the mental capacity of the child."

"The worse the teeth, the worse, as a rule, is the school standing." —JESSEN.

17. A child cannot obtain a high standard of scholarship if his mind is disturbed by aching teeth.

18. Forty per cent of the absences from school are caused by toothache. It has been shown that children with decaying teeth are six months longer in completing the eight common school grades, than are children with clean mouths and sound teeth. Wouldn't it pay to take care of the children's teeth?

19. The experience of school dental clinics has demonstrated their necessity. In no branch of public hygiene are such decisive results obtained and with such relatively small costs.

20. There is no doubt that the development of tuberculosis is favored to a large extent by a bad condition of the teeth.

21. "A well conducted school dental clinic is the best and most effective institution for the prevention of tuberculosis." —JESSEN.

SLIDES SHOWING ERUPTION OF TEETH

A group of slides showing dentition at different ages may be purchased for 35 cents each. These are excellent for teaching either the laity or the student. The slides illustrate the following:

No. 101 Skull at Birth
No. 102 Skull 10 months after birth
No. 103 Dentition at 18 months
No. 104 Dentition at 3 years and 6 months
No. 105 Dentition at 6 years
No. 106 Dentition at 7 years
No. 107 Dentition at 11 years
No. 108 Jaw in old age
No. 109 Table showing approximate age at which the various teeth erupt

MOTION PICTURES

Reprints of the list of nontechnical and technical dental films published in the August issue of THE JOURNAL may be secured at 10 cents each.

BULLETINS FOR THE LAITY

The American Academy of Periodontology has granted the American Dental Association the privilege of distributing the bulletins compiled and copyrighted by the Academy: "How to Build Sound Teeth" and "Children's Teeth—How to Build and Use Them." Prices follow:

Single bulletins	
1-10 copies, postage prepaid	5c each
10-100 copies, postage prepaid	4c each
100 copies, postage prepaid	$ 3.00
500 copies, expressage collect	12.50
1,000 copies, expressage collect	23.00
Two bulletins in one	
1-10 copies, postage prepaid	7c each
10-100 copies, postage prepaid	6c each
100 copies, postage prepaid	$ 4.75
500 copies, expressage collect	20.00
1,000 copies, expressage collect	35.00

STORIES

Stories have a distinct place in the habit-forming stage of childhood. Simple facts, attractively clothed, make an indelible impression. For school use, there is a group of seven "Better Teeth" stories, in mimeographed form, at 35 cents. The stories are:

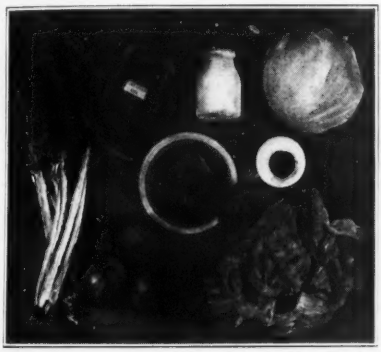
Johnny Bear and the Busy Bees, by Ernest C. Dye, D.D.S.
The Key Flower, by C. Carroll Smith, D.D.S.
Clara Cleans Her Teeth, by Margaret E. Greenwood and Eleanor M. Fonda
Jack and the Chew-Chew Fairy, by C. Carroll Smith, D.D.S.
Old Grouchy Man Toothache, by Theresa Dansdill
The Brushes' Quarrel, by C. E. A. Winslow.
The Pearl Fairy, by Evelyn C. Schmidt

SONGS AND RHYMES

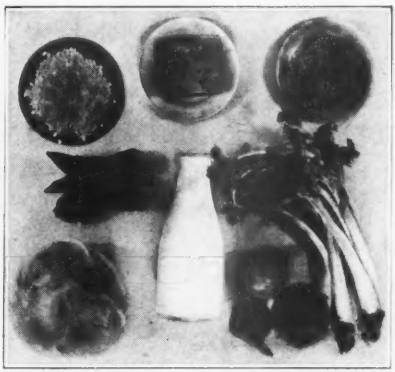
Fifteen pages of happy, wholesome songs and rhymes, which will help inculcate the "clean mouth" habit in the school child may be purchased for 25 cents.

POSTERS

To aid the person who is going to lecture on preventive dentistry and who plans to emphasize the nutritional aspect of the subject, there is offered a set of six large hand-colored posters showing the foods that are abundant sources of calcium, iron, phosphorus and vitamins A, B and C. With the set are three enlarged photographs showing "new bone due to proper feeding after bone destruction caused by vitamin deficiency diet," "alternating zones of bone structure due to periods of normal and abnormal feeding," and "skulls of rabbits fed on diet with a vitamin deficiency." For the photographs we are indebted to Dr. Percy R. Howe, Forsyth Dental Infirmary, Boston; for the posters, to the Massachusetts Department of Public Health. The set, two of which are shown below, may be rented for $5.00 a week.



Food Providing Fat Soluble A Promotes Growth, Prevents Rickets and Xerophthalmia in Young



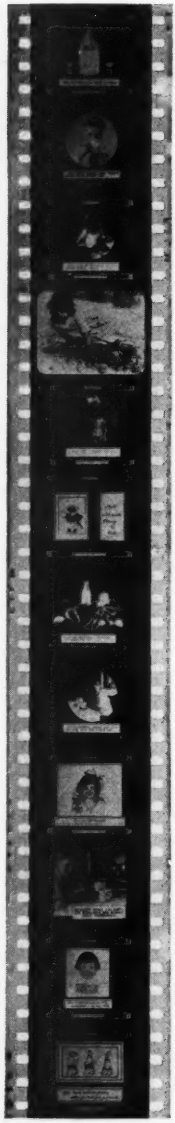
Foods Providing Calcium. Necessary for Strong Bones

REPRINTS

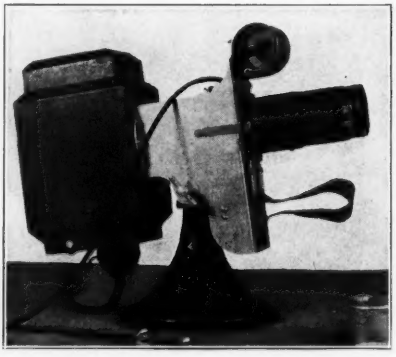
The following articles may be purchased singly or a package containing the group may be procured for $1.00.

1. "A Wider Interest In Industrial Dentistry," by Henry L. Banzhaf, B.S., D.D.S., F.A.C.D., 10 cents per copy.
2. "One Hundred Per Cent Good Mouths—How Obtained in the Public Schools of Jackson, Mississippi," Gladys Eyrich, 5 cents per copy.
3. "Mouth Hygiene Lecture for High School Students and Adults," by Earle S. Braithwaite, D.D.S., 10 cents per copy.
4. "Industrial Dentistry," by Henry L. Banzhaf, B.S., D.D.S., F.A.C.D., 10c per copy.
5. "A Real Challenge to the Dental Profession," by Otto U. King, D.D.S., 10 cents per copy.
6. "Financing Mouth Hygiene," by Harris R. C. Wilson, D.D.S., 5 cents per copy.
7. Report of the Council on Mouth Hygiene and Public Instruction on the Public Health Exhibit at the Los Angeles Meeting, 5 cents per copy.
8. Report of the Research Commission, by Frank O. Hetrick, 5 cents per copy.
9. "Regional Anatomy, Emphasizing Mandibular Movements With Specific Reference to Full Denture Construction," by H. J. Prentiss, M.D., 10 cents per copy.
10. Secretary's Report to the Dental Educational Council of America, by Albert L. Midgley, D.M.D., Sc.D., 10 cents per copy.
11. Complete Report of The First International Mouth Hygiene Conference, by W. R. Wright, D.D.S., Jackson, Miss., 25 cents per copy.

PICTUROL AND MACHINE



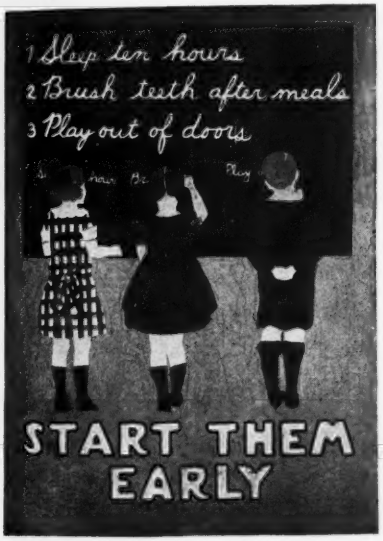
Picturols and the picturol machine are an innovation in dental health education. The machine is notable for its lightness, weighing 4 pounds; while the carrying case weighs 6, making a total of only 10 pounds. It is simple to operate; takes a film rather than glass slides, such as are ordinarily used for still pictures; so that one need not fear that a picture will be broken or will be shown out of order. The machine throws a clear picture about 40 feet with a 3-inch lens or 60 feet with a 4-inch lens. The picturol illustrated here consists of forty-eight pictures on mouth hygiene. It is intended primarily for school children, emphasizing the uses of the teeth, the nutritional aspect, the importance of mastication, the relationship of the deciduous and permanent teeth, the importance of the sixth year molars, and the necessity of daily care and of frequent visits to the dentist. The picturol, "Your Teeth" may be purchased for $3.50; the picturol machine for $55.00, the carrying case for $10.00. The picturol and machine may be rented for $2.00 a day or $10.00 a week.



POSTER CONTESTS

A nation-wide health poster contest recently conducted by "Hygeia," the journal of individual and community health, published by the American Medical Association, created so much interest that 45,000 posters were entered. Forty-eight of these were awarded prizes, varying from $100.00, the first prize, to $1.00.

Were every state dental society, through the committee on mouth hygiene and public instruction, to carry out a similar plan in its state, having a contest of posters on dental health, much interest in preventive dentistry would be aroused in the schools, the homes and the community at large.



One of the prize winning "Hygeia" posters

To do this, it would be necessary to obtain the cooperation of the state commissioner of education, who would notify the superintendents of schools and the teachers of the contest. The state commissioner of education, state commissioner of public health, state supervisor of drawing, president of the state dental society and the chairman of the committee on mouth hygiene and public instruction might serve as a committee to draw up the conditions governing the contest. The posters might be shown at the state dental society meeting, at which time the foregoing committee would judge the posters and award the prizes. Such a contest should be given extensive newspaper publicity, which would increase its educational possibilities.

FREE DENTAL TREATMENT IN BOSTON

This summer the children of Boston were given an added opportunity to have free dental treatment at the Forsyth Dental Infirmary, through the cooperation of the playground department of the Boston Public Schools. On each Monday, the children were taken from the different playgrounds to the infirmary in a bus, under the supervision of a teacher, who also directed the return of each child from the infirmary after the necessary work had been done.

PROPHYLACTIC WORK IN SCHOOLS AND INSTITUTIONS

A report from Rochester Dental Dispensary shows that 99,174 prophylactic treatments were given in schools and public institutions, and 55,009 children attended lectures on dental health during the last school year.

"GOOD TEETHKEEPING"

Doubtless, thousands of eyes were attracted by the appealing baby in the center of a page of information on "Good Teethkeeping," which was published by the Metropolitan Life Insurance Company in the September issue of many of the leading magazines. Not only was the story of tooth conservation told in an interesting and concise manner, but an appeal was also made for organized, concerted effort by taxpayers to introduce an oral hygiene program into the schools of their community.

AMERICAN PUBLIC HEALTH ASSOCIATION

The annual meeting of the American Public Health Association will be held at Detroit, Michigan, October 23. A paper on "Dental Hygiene for the Child" will be given by Dr. C. N. Johnson, discussion by Dr. William A. Giffen.

FOR THE WAITING ROOM TABLE

Dentists have an excellent opportunity to interest children in health, by displaying a few attractive health books on the table in the waiting room of their private offices or of the school dental clinic. Any of the books mentioned below present the health message in a delightful, fascinating manner. The books which are starred are on oral health. All of these books may be ordered through local booksellers.

TITLE	AUTHOR	PUBLISHER
A Journey to Health Land	Andress	Ginn & Co.
Boys and Girls of Wake-Up Town	Andress	Ginn & Co.
All Through the Day in the Mother Goose Way	Broadhurst	J. B. Lippincott Co.
The Land of Health	Hallock & Winslow	Merrill
Mary Gay Stories	Booth & Carter	World Book Co.
The Wonderful House That Jack Built	Willard	The Macmillan Company
Jack O'Health and Peg O'Joy	Herben	Charles Scribner's Sons
Clean Peter and the Children of Grubby Lee	Adelborg	Longmans, Green & Co.
The Most Wonderful House in the World	Haviland	J. B. Lippincott Co.
The Play House	Haviland	J. B. Lippincott Co.
Health Habits	O'Shea & Kellogg	The Macmillan Company
Gulick Series	Gulick	Ginn & Co.
Healthy Living, Books I & II	Winslow	Charles E. Merrill Company
Healthy Lessons, Books I & II	Davidson	American Book Co.
Keep Well Stories for Little Folks	Jones	J. B. Lippincott Co.
*Child's Book of the Teeth	Ferguson	World Book Co.
*The Toothbrush Man's Own Book	Cavanor	Arrow Publishing Co.
*Billy Forget-me-not and Buddy	Tanner	DeSanno & Hoskins
*The DeKay Brownies	Proctor	
*Your Teeth	Towne	Welch Mfg. Co.
*The Grinder Family	Ferguson	World Book Co.
Mother Earth's Children	Gordon	P. F. Volland Co.
Sure Pop and the Safety Scouts	Bailey	World Book Co.
Cho Cho and the Health Fairy	Griffith	The Macmillan Company
Rosy Cheeks and Strong Heart	Andress	American Child Health Ass'n.
Child Health Alphabet		American Child Health Ass'n.

SOUTHERN ACADEMY OF PERIODONTOLOGY

The educational committee of the Southern Academy of Periodontology has recently written and compiled a series of sixty-two articles on dental subjects for newspaper publication. The intent of these articles is to educate the public in different phases of dentistry, and ultimately, to stimulate and lead to the establishment of dental clinics and educational work in the public schools. To date, thirty daily papers in the south are running the series. The committee is furnishing the reprints of these articles free of charge to any state organization or society. If interested, write to Dr. C. B. Fowlkes, 610 Brown-Marx Building, Birmingham, Ala.

Medical and Dental News

NORTH CAROLINA

Children's Amendment: Last week, the Senate of North Carolina rejected the proposed child labor amendment to the Constitution. This makes the third state to take action. Florida has rejected; Arkansas has ratified. Since, to become effective, three-quarters of the states must ratify, the rejection of the measure by eleven more states would defeat it. But, as yet, the business of state consideration has been only begun.—Time, September 1, 1924.

OREGON

Classification of North Pacific College: At a recent meeting of the Dental Educational Council of America, North Pacific College of Oregon was placed in Class A.

VIRGINIA

Children's Clinic Opened: The Children's Memorial Clinic, Richmond, Va., was formally opened, August 7, with Dr. Basil B. Jones, medical director and head of the pediatric department. The clinic has been organized to carry into effect recommendations in the child welfare laws passed by the General Assembly, 1922, which provide that children under the care of institutions be given a thorough mental and physical examination. The clinic has therefore a pediatric and a neuropsychiatric department. The Commonwealth Fund, which cooperated with the social agencies of Richmond and Virginia in organizing the clinic, will provide $12,000 for the first annual budget. The clinic will make possible the examination of every school child as well as those committed to an institution, and will, in fact, be a clearing house for children's health problems for Richmond.—Journal of the American Medical Association, August 23, 1924.

FOREIGN

International Dental Federation: The seventeenth annual meeting of the International Dental Federation was held this year in the city of Luxemburg, on August 3, 4 and 5. The Town Hall was placed at the disposal of the Federation by the municipality, and the Mayor received the members in the council chamber. At the opening meeting, the Director-General of Education in Luxemburg (Herr Nevens) presided in the absence of His Excellency Emile Reuter, the Prime Minister. He was supported by the Marquis of Brichanteau, Italian Ambassador to Luxemburg, Dr. Weber, President of the Society of Medical Sciences, Dr. Forman, representing the Medical College, and Dr. Krombach, President of the Union of Folk and School Hygiene. M. Aloyse Decker of Luxemburg introduced the Federation in a short speech, and Herr Nevens, on behalf of the Prime Minister, read an address in French, which expressed the Government of the Grand Duchy's high appreciation of the considerable progress made in recent years in odontological science and its gratification at the honour of the visit of the International Dental Federation. Speeches were afterwards delivered by the dental representatives of various countries commencing with that of France by M. A. Blatter (Paris), followed by Dr. Schaeffer-Stuckert (Frankfort, Germany), Dr. H. E. Friesell (Pittsburgh, U. S. A.), Dr. G. Baudoux (Brussels), M. Griepeschoek (Riga) and Mr. W. B. Paterson, (London.) The last-named speaker, remarking upon the reappearance of a more fraternal spirit among the dentists of Europe, as exhibited by their delegates' speeches, expressed the opinion that such a manifestation of solidarity would result in a success for the next International Dental Congress, which is to be held in Philadelphia, U. S. A., in 1926. He expressed the regret of British dentists that the International Congress, prepared for with great labour and care in London in

1914, had been ruined at the last moment by the commencement of the Great War. Dr. Truman W. Brophy (Chicago), President of the International Dental Federation, having thanked the Government representative and the various speakers, the meeting adjourned for the consideration of the various matters of the programme by the several commissioners appointed. The Hygiene Commission reported its opinion that, in view of the prevalence of dental caries in all civilized countries throughout the world, and the dangers to public health resulting therefrom, a dental department ought to be established in every Ministry of Health, to be under the control of a dental director. The Documentation Commission reported that it had established in the Palais Mondial, Brussels, a catalogue of all the important works and papers on dental subjects published during the past seventeen years. The cataloguing was done on the latest and most approved system, both as regards the title of subject and name of author. Dentists and others were now able to obtain copies of papers, etc., at a nominal fee, by writing to the Director of the Palais Mondial, or references to subjects or authors would be sent for the cost of postage. A curious incident in connection with cataloguing was the publication weekly of a Russian journal of references to books, papers and other dental communications published all over the world, at the expense of the Soviet Government of Russia. No such elaborate work was published by any other nation or by any other Government. The Palais Mondial had received a copy weekly from Russia during the past two years. The Miller Memorial Prize, awarded by the International Dental Federation every two years for important work done in connection with dental science or for dentists, was awarded to Dr. Truman W. Brophy, Dean of the Dental School of Chicago. Mr. J. Howard Mummery (London), on behalf of the Federation, announced the award and congratulated the recipient. Various matters of organization connected with the forthcoming International Dental Congress in Philadelphia in 1926 were brought before the Federation by Dr. Otto U. King (Chicago), the General Secretary of the Congress, and were replied to by Dr. W. Guy, Dean the Edinburgh Dental School, Professor Gilmour of Liverpool University and Dr. G. Villain (Paris). The fund organized by the Federation for the relief of distress among Russian dentists in 1923 was reported upon by Dr. Floristan Aguilar (Madrid), who with Dr. Georges Villain (Paris) acted as honorary secretary in the collection and distribution. Over 280 complete sets of dental instruments were distributed, each set consisting of a small and compact dental engine, instruments and materials for tooth stoppings, and extraction forceps. Dr. Aguilar and his wife obtained passports from the Soviet Government and visited Petrograd (Leningrad), Moscow and Odessa for the purposes of investigation and distribution. A cordial vote of thanks was passed by the Federation to Dr. and Madame Aguilar for their courageous and noble actions. The business proceedings of the Federation in Luxemburg terminated with a banquet at the casino, or chief club of the city. The next meeting of the International Dental Federation was fixed to take place in Geneva on August 5 and the following days, 1925.—Dental Record, September, 1924.

Dentistry in Australia: It is interesting to note in the annual report that the by-laws of the Dental Board enact that from January 1, 1926, private apprenticeship will be abolished, and all students will be required to serve four years at a recognized dental hospital. There can be no doubt that this is a decided step forward. It means that students will receive a better and a more uniform training. At present, a student who is apprenticed to a dentist loses considerable time journeying to and from lectures, and in some cases the dentist is too busy in his surgery to pay much attention to the apprentice. In addition, the methods used may vary considerably from the teaching at the hospital, which may make it very hard for the student at examination time. It is very gratifying to note the advances made in all the Australian states in the education of the student.—Australian Journal of Dentistry, July 1, 1924.

GENERAL

Elimination of Pneumonia: The Journal of the American Medical Association predicts the probable elimination of pneumonia within a very short time through the extensive use of specific antitoxic serums. Within recent years, the mortality has decreased as a result of our better knowledge of the nature of the disease.—Journal Indiana State Medical Association, August, 1924.

AMERICAN DENTAL ASSOCIATION SIXTY-SIXTH ANNUAL SESSION

DALLAS, TEXAS, NOVEMBER 10, 11, 12, 13, 14, 1924

OFFICIAL CALL

To the Officers, Members and Constituent Societies of the American Dental Association:

You are hereby notified that the Sixty-Sixth Annual Session of the American Dental Association will be held at Dallas, Texas, on November 10, 11, 12, 13 and 14, 1924.

The House of Delegates will convene at 10:00 o'clock in the forenoon and 2:30 o'clock in the afternoon, Monday, November 10, 1924, in the Assembly Room of the Art Gallery, Dallas, Texas. All subsequent meetings of the House of Delegates will be held in the same place.

The general meeting, which constitutes the opening exercises of the Session, will be held on Tuesday, November 11, 1924, at 9:40 a. m. in the Convention and Exhibit Hall, Dallas Texas, and general meetings will be held at 8:00 p. m. on that and subsequent days of the Session.

The various sections of the American Dental Association will meet Tuesday, November 11, 1924, at 2:00 o'clock p. m. and thereafter according to their respective programs.

The Registration Department will be open from 8:30 o'clock a. m. until 5:00 o'clock p. m. on Monday, Tuesday, Wednesday, and Thursday, November 10, 11, 12 and 13, and from 8:30 a. m. to 10:00 a. m. on Friday, November 14, at the entrance of the Convention and Exhibit Hall, Dallas, Texas.

The constituent Societies are hereby notified to file with the General Secretary of this Association, at least thirty (30) days prior to the first day of said Annual Session, a list of names and addresses of their delegates and alternates.

WILLIAM A. GIFFEN, *President,*
OTTO U. KING, *Secretary.*

MEMBERS OF THE HOUSE OF DELEGATES, 1924

A Preliminary Roster of the Legislative Body of the American Dental Association

DELEGATES AND ALTERNATES*

ALABAMA

(Members, 285; Delegates, 2)

Delegates

C. E. Zuber, First National Bank Bldg., Birmingham

Olin Kirkland, 712-722 Shepherd Bldg., Montgomery

Alternates

C. W. Lokey, Empire Bldg., Birmingham

H. Clay Hassell, Tuscaloosa

ARIZONA

(Members, 40; Delegates, 1)

Delegate

H. H. Braxton, Heard Bldg., Phoenix

Alternate

J. A. Lenty, First Ave. and Adams St., Phoenix

ARKANSAS

(Members, 131; Delegates, 2)

Delegates

A. E. Chambers, Texarkana

E. H. Johnson, Pine Bluff

Alternates

W. T. Rowland, Ft. Smith

W. E. Hutcheson, Dermott

*This list will be revised, Oct. 10, 1924, in accordance with the ruling as presented in the Constitutional By-Laws, under "Qualifications, Terms and Registration of Delegates and Alternates": Sec. 3.—The number of delegates to which each constituent society may be entitled shall be based on the number of members from whom dues for the current year shall have been received by the general secretary of this Association at least thirty days prior to the first day of the annual Session of this Association. . . .Sec. 6—Previous to the annual Session the general secretary of this Association shall prepare and have printed a list of the delegates and alternates, elected by the various constituent societies; also the number of paid members of each.

ARMY DENTAL CORPS

(Members, 82; Delegates, 1)

Delegate

Julien R. Bernheim, Lieut.-Col., Fort Sam Houston, Texas

Alternate

Eugene Millburn, Major, Fort Sam Houston, Texas

CALIFORNIA

(Members, 892; Delegates, 5)

Delegates

Guy S. Millberry, First and Parnassus Aves., San Francisco

B. Frank Gray, 209 Post St., San Francisco

Henry E. Miller, 516 Sutter St., San Francisco

William R. Bacon, 209 Post St., San Francisco

Arthur R. McDowell, 344 Fourteenth St., San Francisco

Alternates

Hugh Avery, Head Bldg., San Francisco

James A. Graham, 209 Post St., San Francisco

SOUTHERN CALIFORNIA

(Members, 853; Delegates, 5)

Delegates

Bert Boyd, 1010 Story Bldg., Los Angeles

Frank Giguette, Dodworth Bldg., Pasadena

Charles M. Benbrook, 707 Auditorium Ag., Los Angeles

Lewis E. Ford, 634 S. Western Ave., Los Angeles

Wallace Spinks, 910 Security Bldg., Los Angeles

J. Walter Gray, 910 Union Bank Bldg., Los Angeles

Alternates

Charles E. Rice, 1006 Story Bldg., Los Angeles

J. L. Howard, Security Bank Bldg., Hollywood

Ralph R. Hartley, 1009 Brockman Bldg., Los Angeles

Charles McBean, Hollingsworth Bldg., Los Angeles

George H. Walker, 905 Brockman Bldg., Los Angeles

F. E. Hageboon, Los Angeles

COLORADO

(Members, 358; Delegates, 3)

Delegates

W. T. Chambers, 719 Metropolitan Bldg., Denver

C. S. Kramer, Woodmen

E. R. Warner, 412 Metropolitan Bldg., Denver

Alternates

A. H. Ketcham, 725 Mack Bldg., Denver

M. J. Porter, Grand Junction

Isaac Burton, 204 Hagerman Bldg., Colorado Springs.

CONNECTICUT

(Members, 552; Delegates, 4)

Delegates

C. W. Roberts, 57 Pratt St., Hartford

G. S. B. Leonard, 36 W. Main St., Mystic

C. F. Gibbs, 886 Main St., Bridgeport

E. S. Gaylord, 63 Trumbull St., New Haven

Alternates

E. R. Bryant, 215 Whitney Ave., New Haven

A. C. Fones, 10 Washington Ave., Bridgeport

T. A. Ganung, 1115 Main St., Bridgeport

M. J. Loeb, 66 Trumbull St., New Haven

DELAWARE

(Members, 8; Delegates, 1)

Delegate

Clyde A. Nelson, Milford

DISTRICT OF COLUMBIA

(Members, 233; Delegates, 2)

Delegates

Mark F. Finley, 1928 I St., N.W., Washington

A. J. Brown, 1819 Vernon St. N.W., Washington

Alternates

Thomas L. Rust, 1410 L St., N.W., Washington

D. S. Thorn, 1029 Vermont Ave., Washington

NATIONAL CAPITAL

Delegate

E. A. Bryant, 921 15th St., N. W., Washington

Alternate

C. Willard Camalier, 921 15th St., N. W., Washington

FLORIDA

(Members, 150; Delegates, 2)

Delegates

H. C. Farrin, St. Augustine

A. B. Whitman, Orlando

Alternates

Jesse D. Williams, Jacksonville

E. H. Clarkson, Jacksonville

GEORGIA

(Members, 409; Delegates, 3)

Delegates

DeLos L. Hill, Grant Bldg., Atlanta

A. A. Lawry, Valdosta

R. H. Calhoun, Augusta

Alternates

M. D. Huff, Candler Bldg., Atlanta

F. C. Wilson, Savannah

H. H. Johnson, Macon

HAWAIIAN ISLANDS

(Members, 47; Delegates, 1)

Delegate

William Mann, Honolulu

IDAHO

(Members, 104; Delegates, 2)

Delegate

M. Y. Lucas, Boise

Alternate

R. J. Cruse, Pocatello

ILLINOIS

(Members, 2,940; Delegates, 16)

Delegates

Arthur G. Smith, 511 Central National Bank Bldg., Peoria
P. G. Puterbaugh, 29 E. Madison St., Chicago
Albert E. Converse, Leland Office Bldg., Springfield.
J. H. Prothero, 22 E. Washington St., Chicago
W. F. Whalen, 906 Lehman Bldg., Peoria
M. M. Printz, 25 E. Washington St., Chicago
C. N. Johnson, 22 E. Washington St., Chicago
H. B. Pinney, 108 N. State St., Chicago
P. A. Pyper, Pontiac
Charles R. Baker, 627 Grove St., Evanston
E. D. Coolidge, 25 E. Washington St., Chicago
John H. Cadmus, 25 E. Washington St., Chicago
George N. West, 30 N. Michigan Blvd., Chicago
C. M. Smith, 618 Jefferson Bldg., Peoria
Benjamin S. Partridge, 1230 E. Sixty-Third St., Chicago
J. C. Waddell, 501 Missouri Ave., East St. Louis.

Alternates

O. J. Olafsson, 506 S. Elmwood Ave., Oak Park
L. B. Torrence, Chester
J. K. Conroy, First National Bank Bldg., Belleville
R. R. Blanchard, First National Bank Bldg., Springfield
Harold S. Smith, 1010 Belmont Ave., Chicago
A. B. Patterson, 406 Heggie Bldg., Joliet
J. C. Black, Del Prado Hotel, Chicago
C. H. H. Brevig, 3329 Fullerton Ave., Chicago
F. E. Roach, Mallers Bldg., Chicago
T. A. Broadbent, 25 E. Washington St., Chicago
Victor H. Fuqua, 25 E. Washington St., Chicago
R. H. Daniels, 909 Lehman Bldg., Peoria
F. B. Moorehead, 30 N. Michigan Ave., Chicago
H. A. Frankel, 190 N. State St., Chicago
W. E. Harper, 3441 Michigan Ave., Chicago
H. R. H. Brevig, 3329 Fullerton Ave., Chicago

INDIANA

(Members, 987; Delegates, 6)

Delegates

A. R. Ross, Lafayette
C. R. Jackson, 907 Hume Mansur Bldg., Indianapolis
C. E. Redman, Peru
P. N. Chadwick, Rushville
W. E. Neuenschwander, Ft. Wayne
F. R. Henshaw, 508 Pythian Bldg., Indianapolis
H. C. McKittrick, 1006 I.O.O.F. Bldg., Indianapolis.

IOWA

(Members, 882; Delegates, 5)

Delegates

F. H. Waters, Ames
J. G. Hildebrand, Waterloo
J. H. Calder, Cedar Rapids
C. M. Kennedy, 603 Iowa National Bank Bldg., Des Moines
H. E. Latcham, Davidson Bldg., Sioux City
Earle S. Smith, Iowa City

Alternates

Charles H. Henshaw, 1112 Bankers Trust Bldg., Des Moines
R. H. Volland, Iowa City
John V. Conzett, Dubuque
E. L. Moravec, Cedar Rapids
Charles E. Woodbury, Council Bluffs
J. E. Forney, Keokuk

KANSAS

(Members, 501; Delegates, 4)

Delegates

D. T. Parkinson, Beacon Bldg., Wichita
G. A. Crise, Manhattan
F. O. Hetrick, Ottawa
G. E. Burket, Kingman

Alternates

C. A. Martin, Winfield
L. D. Mitchell, Arkansas City
C. L. Hixon, Atchison
W. T. Triplett, Salina

KENTUCKY

(Members, 433; Delegates, 3)

Delegates

E. B. Hardin, Madisonville
E. C. Hume, Francis Bldg., Louisville
J. F. Wright, Russell
H. B. Tileston, Sr., Starks Bldg., Louisville

Alternates

W. W. Wilkinson, Paducah
Frank B. Hower, City Hospital, Louisville
M. L. Myers, Winchester
T. H. Posey, Lawrenceburg

LOUISIANA

(Members, 194; Delegates, 2)

Delegates

J. P. Wahl, 1135 Maison Blanche, New Orleans
J. S. Bernhard, Hutchinson Bldg., Shreveport

Alternates

T. S. Bennett, Lake Charles
L. J. Schoeny, Donaldsonville

MAINE

(Members, 198; Delegates, 2)

Delegates

L. R. Lafond, Lewiston
F. S. Woods, Portland

Alternates

Harold L. Smith, 241 High St., Portland
E. Fred Briggs, Bangor

MARYLAND

(Members, 320; Delegates, 3)

Delegates

Horace M. Davis, Professional Bldg., Baltimore
J. H. Ferguson, Jr., 914 N. Charles St., Baltimore
J. Ben Robinson, 219 W. Monument St., Baltimore

Alternates

A. P. Badger, 1111 Edmondson Ave., Baltimore
Harry E. Kelsey, 833 Park Ave., Baltimore
A. H. Paterson, Commonwealth Bank Bldg., Baltimore

MASSACHUSETTS

(Members, 1,055; Delegates, 6)

Delegates

Frank T. Taylor, 419 Boylston St., Boston
Leroy M. S. Miner, 153 Newbury St., Boston
W. H. Grant, 107 Massachusetts Ave., Boston
David F. Spinney, 1330 Beacon St., Brookline
M. C. Smith, 3 Lee Hall, Lynn
Harold W. Alden, Northampton
Frank Dean, 311 Main St., Worcester

Alternates

William Rice, 416 Huntington St., Boston
Charles G. Pike, 157 Newbury St., Boston
Benjamin Tishler, 358 Commonwealth Ave., Boston
Harold DeW. Cross, 140 The Fenway, Boston
Percy R. Howe, 140 The Fenway, Boston
E. B. Wyman, 51 Brattle St., Cambridge
F. C. Allen, 1330 Beacon St., Brookline

MICHIGAN

(Members, 1,079; Delegates, 6)

Delegates

Percy Glass, Saginaw
P. J. O'Reilly, 4616 Grand River Ave., Detroit
W. W. Gibson, 201 Loraine Bldg., Grand Rapids
Eldred G. Robbins, Ishpeming
Marcus L. Ward, Ann Arbor
James H. Taylor, 805 Genesee Bank Bldg., Flint
William A. Cook, 1850 David Whitney Bldg., Detroit

Alternates

A. C. Thompson, 1821 David Whitney Bldg., Detroit
C. J. Parker, 1047 David Whitney Bldg., Detroit
Edgar A. Honey, Sr., 903 Hanselman Bldg., Kalamazoo
Charles Lane, 58 Adams St., Detroit
P. C. Lowery, 8453 Gratiot Ave., Detroit
William R. Davis, Flint
William E. Brown, Benton Harbor
Gilbert A. Cotton, Escanaba

MINNESOTA

(Members, 1,261; Delegates, 7)

Delegates

Harry W. Nelson, 801 Physicians & Surgeons Bldg., Minneapolis
F. L. Kaiser, 438 University Ave., St. Paul
H. J. MacKechnie, Hibbing
Boyd S. Gardner, Rochester
Benjamin Sandy, 636 Syndicate Bldg., Minneapolis
F. W. Hinds, Park Rapids
D. D. Miller, Bird Island

Alternates

O. DeForest Davis, 933 Metropolitan Bank Bldg., Minneapolis
V. H. Storberg, 1242 Lowry Bldg., St. Paul
J. B. Kohagen, Fidelity Bldg., Duluth
H. J. Hall, Rochester
A. T. Rowe, 820 LaSalle Bldg., Minneapolis
W. D. Vehe, 1010 Donaldson Bldg., Minneapolis
C. E. Rudolph, 905 Metropolitan Bank Bldg., Minneapolis

MISSISSIPPI

(Members, 133; Delegates, 2)

Delegates

W. R. Wright, Jackson
J. F. Brunson, Meridian

Alternates

N. L. Swayze, Yazoo
R. S. Neyland

MISSOURI

(Members, 995; Delegates, 6)

Delegates

J. P. Harper, St. Louis Dental College, St. Louis
T. E. Purcell, Altman Bldg., Kansas City
C. O. Simpson, 919 University Club, St. Louis
C. H. Hatton, Liberal
R. J. Rinehart, 4091 Bryant Bldg., Kansas City
E. C. Braniger, Maryville
W. H. Bartlett, Wall Bldg., St. Louis

Alternates

E. H. Golden, University Club, St. Louis
J. F. Alcorn, 319 Metropolitan Bldg., St. Louis
George Haigh, Jefferson City
E. H. Westenhaver, 816 Lathrop Bldg., Kansas City
H. L. Stinson, Maryville
W. W. Brown, Joplin
F. M. Fulkerson, Sedalia

MONTANA

(Members, 106; Delegates, 2)

Delegates

A. A. Baker, Glendive
D. H. McCauley, Laurel

NAVY DENTAL CORPS

(Members, 62; Delegates, 1)

Delegate

W. L. Darnall, Lieut.-Com., Washington, D. C.

Alternate

Lucian C. Williams, Lieut.-Com., Washington, D. C.

NEBRASKA

(Members, 452; Delegates, 3)

Delegates

H. E. King, 546 Peters Trust Bldg., Omaha
E. H. Bruening, 1129 First National Bank Bldg., Omaha
G. A. Grubb, University of Nebraska, Lincoln

Alternates

W. L. Shearer, 619 City National Bank Bldg., Omaha
M. E. Vance, Security Mutual Bldg., Lincoln
F. W. Webster, Security Mutual Bldg., Lincoln

NEVADA

(Members, 28; Delegates, 1)

Delegate

C. E. Rhodes, Reno

Alternate

A. A. Wendell, Winnemucca

NEW HAMPSHIRE

(Members, 43; Delegates, 1)

Delegate

J. G. Hammond, Somersworth

Alternate

F. E. McLaren, 967 Elm St., Manchester

NEW JERSEY

(Members, 922; Delegates, 6)

Edward C. Stillwell, Arcade Bldg., Glen Ridge
William W. Hodges, Raritan Bldg., Perth Amboy
Richard S. Hopkins, 913 Broad St., Newark
Matthew C. Pearce, 308 Main St., Orange
William H. Gelston, 40 N. Thirtieth St., Camden
Frederick H. Lum, Jr., Chatham

Alternates

A. R. Slade, 25 High St., Millville
Louis F. Kuntz, 180 Smith St., Perth Amboy
John A. Voorhees, 32 Eppirt St., East Orange
Charles Faupel, 484 Bergen Ave., Jersey City
Thomas W. Bunting, 1800 Broadway, Camden
C. E. C. Smith, 15 South St., Newark

NEW MEXICO

(Members, 51; Delegates, 1)

Delegate

C. M. Hurley, Clayton

Alternate

M. A. Grissom, Roswell

NEW YORK

(Members, 3,052; Delegates, 16)

Delegates

Alfred S. Walker, 100 W. Fifty-Ninth St., New York
A. M. Wright, 4 St. Paul Place, Troy
F. A. Gough, 184 Joralemon St., Brooklyn
A. C. Rich, 96 Lake Ave., Saratoga
A. R. Cooke, 815 University Bldg., Syracuse
C. M. Dunne, Norwich
E. G. Link, 226 Cutler Bldg., Rochester
Louis Meisburger, 468 Delaware Ave., Buffalo
W. C. Fisher, Bronxville
Harvey J. Burkhart, 300 Sibley Block, Rochester
Martin Dewey, 501 Fifth Ave., New York
Guy M. Fiero, 1355 Main St., Buffalo
E. R. Webb, 415 University Bldg., Syracuse
R. Ottolengui, 80 W. Fortieth St., New York
H. D. Whitmarsh, Binghamton
J. W. Canaday, 283 State St., Albany

Alternates

Herbert L. Wheeler, 560 Fifth Ave., New York
T. P. Hyatt, 576 Fifth Ave., New York
George Vanderpool, Rm. 200, 90 State St., Albany
L. A. Timmerman, Canal, Fort Plain
G. B. Beach, 518 S. A. & K. Bldg., Syracuse
A. B. Needham, Oneida
W. W. Smith, 365 East Ave., Rochester
G. G. Pritchard, 468 Delaware Ave., Buffalo
A. W. Twiggar, Ossining
A. P. Burkhart, 89 Genesee St., Auburn
Theodor Blum, 140 West Fifty-Seventh St., New York
A. Hoffman, 381 Linwood Ave., Buffalo
James F. Hasbrouck, 40 E. Forty-First St., New York
B. S. Hert, 713 C. of C. Bldg., Rochester
Charles F. Baylis, Oneonta
E. I. Harrington, Watertown

NORTH CAROLINA

(Members, 364; Delegates, 3)

Delegates

J. M. Fleming, Raleigh
J. H. Wheeler, Greensboro
F. L. Hunt, Ashville

Alternates

H. O. Lineberger, Raleigh
W. T. Martin, Benson
W. M. Morrow, Burlington

NORTH DAKOTA

(Members, 163; Delegates, 2)

Delegates

H. C. Cooper, Abercombie
O. L. Kermott, Towner

Alternates

Tom Smith, Langdon
W. E. Hocking, Devils Lake

OHIO

(Members, 1,949; Delegates, 11)

Delegates

L. P. Bethel, 185 E. State St., Columbus
H. M. Semans, Dental College, N. Park St., Columbus
F. M. Casto, 1334 B. F. Keith Bldg., Cleveland
G. C. Nixon, Mahoning National Bank Bldg., Youngstown
J. F. Stephan, 1124 Guardian Bldg., Cleveland
L. L. Barber, 718 Spitzer Bldg., Toledo
Harry Cope, 327 E. State St., Columbus
Charles W. Mills, 3831 W. Twenty-Fifth St., Chillicothe
T. I. Way, 341 Doctors' Bldg., Garfield Place, Cincinnati

Alternates

W. H. Hayden, 228 Lincoln Ave., Youngstown
G. D. Edgar, Defiance
C. Stanley Smith, 511 Neave Bldg., Cincinnati
E. S. Braithwaite, Willard
G. H. Williamson, Portsmouth
J. V. Gentilly, 784 Rose Bldg., Cleveland
E. L. Pettibone, 6503 Detroit Ave., Cleveland
J. K. Douglas, Sandusky
J. J. Welker, 1143 Ohio Bldg., Toledo

OKLAHOMA

(Members, 315; Delegates, 3)

Delegates

L. L. Barnes, Oklahoma City
C. L. White, Oklahoma City
C. R. Lawrence, Enid

Alternates

A. E. Bonnell, Muskogee
Charles A. Ruhlen, Cushing
A. B. Walker, Norman

OREGON

(Members, 287; Delegates, 2)

Delegates

Clyde Mount, Oregon City
L. A. Baldwin, Selling Bldg., Portland

Alternates

Herbert C. Miller, N. P. College, Portland
W. W. Walker, Grants Pass

PENNSYLVANIA

(Members, 2,225; Delegates, 12)

Delegates

Otto J. Specker, 51 N. Fourth St., Reading
W. L. Fickes, 1101 East End Trust Bldg., Pittsburgh
H. E. Friesell, 1206 Highland Bldg., Pittsburgh
L. P. Anthony, 211 S. Twelfth St., Philadelphia
C. R. Turner, Evans Institute, Philadelphia
R. H. D. Swing, 126 S. Fifteenth St., Philadelphia
W. J. McKinley, N. E. Cor. Seventeenth & Spruce Sts., Philadelphia
W. E. Mendel, 405 E. Ohio St., Pittsburgh
P. V. McParland, 706 Highland Bldg., Pittsburgh
F. C. Friesell, 1206 Highland Bldg., Pittsburgh
A. C. Young, 1206 Highland Bldg., Pittsburgh
A. J. Wise, Schmidt Bldg., Pittsburgh
William Finn, 513 Roslyn Place, Pittsburgh
A. C. Barclay, 914 Highland Bldg., Pittsburgh

Alternates

A. P. Lee, 1616 Locust St., Philadelphia
S. B. Luckie, Chester
J. S. Ashbrook, Jenkins Arcade, Pittsburgh
W. H. Wright, 1306 Penn Ave., Pittsburgh
D. S. Gardner, Dime Bank Bldg., Scranton
A. B. Miller, Kingston
Charles B. Schupack, 250 S. Broad St., Philadelphia
Andrew Jackson Seeler, 525 N. Nineteenth St., Philadelphia
John C. G. Fitzhugh, McKeesport
A. H. Reynolds, 202 Flanders Bldg., Pittsburgh
Carl H. Scholl, Second National Bank Bldg., Reading
Charles W. Swing, 623 Walnut St., Philadelphia
Wilson D. DeLong, 51 N. Fourth St., Reading
Emerson R. Sausser, 234 S. Fifteenth St., Philadelphia

PHILIPPINE ISLANDS

(Members, 2; Delegates, 1)

Delegate

Louis Ottofy, 536 S. Clark St., Chicago

RHODE ISLAND

(Members, 159; Delegates, 2)

Delegates

Joseph P. Massicotte, Olneyville Square, Providence
Albert L. Midgley, Butler Exchange, Providence

Alternates

Herbert T. Beckett, Butler Exchange, Providence
Charles J. Smith, 146 Westminster St., Providence

SOUTH CAROLINA

(Members, 81; Delegates, 1)

Delegates

George W. Dick, Sumter
David Aiken, Winnsboro

Alternates

H. J. Ray, Aiken
E. A. Early, Darlington

SOUTH DAKOTA

(Members, 187; Delegates, 2)

Delegates

B. F. Lockwood, Yankton
E. R. Doering, Parkston

Alternate

Charles Stutenroth, Redfield

TENNESSEE

(Members, 372; Delegates, 3)

Delegates

F. W. Meacham, Hamilton Bank Bldg., Chattanooga
George W. Powers, Bank of Commerce Bldg., Memphis
C. E. Byington, James Bldg., Chattanooga

Alternates

J. G. McDowell, Hitchcock Bldg., Nashville
Justin D. Towner, Exchange Bldg., Memphis
L. G. Noel, 527½ Church St., Nashville

TEXAS

(Members, 566; Delegates, 4)

Delegates

A. L. Frew, Dallas
J. O. Hall, Waco
H. M. Murphy, Temple
W. O. Talbot, Fort Worth
George H. Mengel, El Paso
B. F. Thielen, Paris

Alternates

C. D. Wofford, Plainview
J. G. Fife, Dallas
W. H. Scherer, Houston
W. D. McCarty, San Antonio
Bush Jones, Dallas
C. E. Stephens, San Antonio

TRUSTEES

H. J. Burkhart, Box 35, East Avenue P. O., Rochester, New York
C. W. Hall, Alabama Bldg., Milwaukee, Wis.
Sheppard W. Foster, Atlanta, Ga.
William H. Eaton, (deceased) 419 Boylston St., Boston, Mass.
J. F. Biddle, 517 Arch St., Pittsburgh, Pa.
Carl D. Lucas, 105 Hunter Ave., Kansas City, Mo.
R. H. Volland, Iowa City, Iowa
C. C. Allen, 10th and Troost Sts., Kansas City, Mo.
John D. Millikin, Elkan-Gunst Bldg., San Francisco, Cal.

UTAH

(Members, 225, Delegates, 2)

Delegates

Clifford Roudine, Deseret Bank Bldg., Salt Lake City
Hyrum Bergstrum, Walker Bank Bldg., Salt Lake City.

VERMONT

(Members, 94; Delegates, 1)

Delegate

Fred Braley, Bennington

Alternate

C. H. Cole, Vergennes

VIRGINIA

(Members, 399; Delegates, 3)

Delegates

A. G. Leach, 2704 E. Broad St., Richmond
R. H. Walker, Taylor Bldg., Norfolk
Carter Crafford, Haddington Bldg., Norfolk

Alternates

J. A. C. Hoggan, Professional Bldg., Richmond
H. L. Smith, Charlottesville
H. Wood Campbell, Suffolk

WASHINGTON

(Members, 542; Delegates, 4)

Delegates

Frank W. Hergert, Cobb Building, Seattle
Rodney L. Hearne, Cobb Bldg., Seattle
Aubrey L. Martin, Green Building, Seattle
C. J. Stansbury, Green Bldg., Seattle

WEST VIRGINIA

(Members, 310; Delegates, 3)

Delegates

Herbert E. Guthrie, Huntington
C. H. Neill, Fairmont
W. S. Rosenheim, Williamson

Alternates

H. W. Burnett, Fairmont
Fred E. Hess, Fairmont
L. E. Lawson, Huntington

WISCONSIN

(Members, 965; Delegates, 6)

Delegates

J. J. Wright, 1220 Wells Bldg., Milwaukee
T. A. Hardgrove, Fond Du Lac
C. E. Cleophas, Beloit
H. Morton, 401 First National Bank Bldg., Milwaukee
T. M. Welch, Waupun
E. C. Wetzel, 96 Center St., Milwaukee

Alternates

J. J. Donovan, Neenah
William Hopkinson, 388 Brady St., Milwaukee
N. E. Uelman, 407 Wells Bldg., Milwaukee

WYOMING

(Members, 56; Delegates, 1)

Delegate

C. H. Carpenter, Casper

Alternate

Peter, Appel, Jr., Hynds Bldg., Cheyenne

Announcements

CALENDAR OF MEETINGS

NATIONAL SOCIETIES

American Academy of Periodontology, October 7-9, 1924, Atlanta, Georgia.

American Association of Dental Schools, March, 1925, Chicago, Illinois.

American Dental Assistants' Association, November 10-14, 1924, Dallas, Texas.

American Dental Association, November 10-14, 1924, Dallas, Texas.

American Dental Trapshooters' Association, November 10, 1924, Dallas, Texas.

American Society of Dental Radiographers, November 7 and 8, 1924, Dallas, Texas.

American Society of Oral Surgeons and Exodontists, November 6-8, 1924, Adolphus Hotel, Dallas, Texas.

Delta Sigma Delta, November 10, 1924, Jefferson Hotel, Dallas, Texas.

Dental Protective Association of the United States, December 15, 1924, 4:00 p. m., Palmer House, Chicago, Illinois.

Federation Dentaire Internationale, August 5-7, Geneva, Switzerland.

Federation of American Women Dentists, November 10-12, 1924, Dallas, Texas.

National Alumni Chapter, Psi Omega Fraternity, November 10, 1924, Southland Hotel, Dallas, Texas.

National Alumni Chapter, Xi Psi Phi Fraternity, November 10, 1924, Adolphus Hotel, Dallas, Texas.

National Association of Dental Examiners, November 10, 11, 1924, Dallas, Texas.

STATE SOCIETIES

National Capital, at Washington. D. C., first Tuesday of every month.

October

Florida, Tampa (16-18).

New York Society of Orthodontists, New York City (8).

New York Stomatological Society, New York City (27).

Susquehanna, at Wilkes-Barre (21-23).

November

American Dental Association, at Dallas (10, 11, 12, 13, 14).

Arizona, at Phoenix.

Texas, at Dallas (10, 11, 12, 13, 14).

December

Ohio, at Dayton (2, 3, 4).

January (1925)

Chicago Dental Society, Chicago (21-23).

February (1925)

Minnesota, at Kenwood Armory, Minneapolis (10-13).

May (1925)

Missouri, Kansas City (11-13).

New York, Albany (13-15).

Pennsylvania, Reading (5-7).

MEETINGS OF STATE BOARD OF DENTAL EXAMINERS

Colorado, at Denver, December 2-6, 1924. Secretary, William H. Flint, Littleton, Colorado.

Connecticut, at Hartford, November 18-20, 1924. Recorder, Arthur B. Holmes, 43 Central Avenue, Waterbury, Connecticut.

Indiana, October 27 to November 1, 1924. Secretary, H. C. McKittrick, 1006 I. O. O. F. Building, Indianapolis, Indiana.

Iowa, at Iowa City, December 8, 1924. Secretary, C. B. Miller, 712 Equitable Building, Des Moines, Iowa.

Maryland, at Baltimore, November 11-13, 1924. Secretary, T. L. McCarriar, 1822 North Charles St., Baltimore, Maryland.

Massachusetts, at Boston, October 13-16, 1924. Secretary, J. N. Carriere, State House, Boston, Massachusetts.

Michigan, at Ann Arbor, November 17-22, 1924. Secretary, B. S. Sutherland, 401 Ward Building, Owosso, Michigan.

New Jersey, at Trenton, December 1, 1924. Secretary, John C. Forsyth, 429 E. State Street, Trenton, New Jersey.

FLORIDA STATE DENTAL SOCIETY

The forty-first annual meeting of the Florida State Dental Society will be held, October 16-18, in Tampa.

H. B. PATTISHALL, *President*,
111 West Adams Street, Jacksonville.
F. L. ADAMS, *Secretary*,
West Tampa.

DENTAL SOCIETY OF THE STATE OF NEW YORK

The Dental Society of the State of New York will hold the fifty-seventh annual meeting at the Hotel Ten Eyck, Albany, N. Y., May 13-15, 1925. All literary exercises, clinics and exhibits will be staged at the Hotel Ten Eyck. The society extends a cordial welcome to all ethical dentists. Make reservations early at the Hotel Ten Eyck. Exhibitors are requested to address Dr. E. W. Briggs, 1116 Madison Avenue, Albany, N. Y., for space.

A. P. BURKHART, *Secretary*,
57 East Genesee Street,
Auburn, N. Y.

INDIANA STATE BOARD OF DENTAL EXAMINERS

The next examination of the Indiana State Board of Dental Examiners will be held October 27 to November 1, inclusive. For applications and further information, address

H. C. MCKITTRICK, *Sec'y-Treas.*,
1006 I. O. O. F. Bldg., Indianapolis.

IOWA STATE DENTAL BOARD

The Iowa State Dental Board will meet for the purpose of examining candidates for a license to practice in Iowa at Iowa City, in the College of Dentistry, beginning Monday, December 8, at 9 a. m. An examination for dental hygienists will be given. All papers and credentials must be filed with the secretary ten days prior to the date of the meeting. For further information and application blanks, address

C. B. MILLER, *Secretary*,
712 Equitable Bldg.,
Des Moines, Iowa.

MICHIGAN STATE BOARD OF DENTAL EXAMINERS

The next meeting of the Michigan Board for examinations will be held at Ann Arbor, Michigan, Nov. 17-22, 1924. All communications addressed to the secretary will be promptly answered.

B. S. SUTHERLAND, *Secretary*,
401 Ward Bldg., Owosso, Mich.

MARYLAND STATE BOARD OF DENTAL EXAMINERS

The regular semi-annual meeting of the Maryland State Board of Dental Examiners for the examination of candidates will be held at the University of Maryland, Baltimore College of Dental Surgery Building, 851 North Howard Street, Tuesday, Wednesday and Thursday, November 11-13, at 9 a. m. For further information and application blanks, address

T. L. MCCARRIAR, *Secretary*,
1822 North Charles Street,
Baltimore, Md.

MASSACHUSETTS BOARD OF DENTAL EXAMINERS

The Massachusetts Board of Dental Examiners will hold an examination for registration for both dentists and oral hygienists in the city of Boston, October 13-16. Full information, application blanks, etc., may be secured at the office of the secretary, Room 146, State House, Boston. All applications must be filed at the office of the secretary at least ten days before the date set for the examination.

J. N. CARRIERE, *Secretary*,
State House, Boston.

THE NEW YORK STOMATOLOGICAL SOCIETY

The next meeting of the New York Stomatological Society will be held on Monday afternoon, October 27, 1924, at 2 o'clock, at 597 Fifth Avenue, New York City. Dr. Stanley Slocum will give a clinic and present a paper on "The Technique of Porcelain Jacket Crowns and the Relationship to Periodontia.

STANLEY SLOCUM, *President*,
597 Fifth Avenue.
F. W. MCDONALD, *Secretary*,
33 W. Forty-second Street.

AMERICAN SOCIETY OF ORAL SURGEONS AND EXODONTISTS

NOTICE OF CHANGE OF DATE

Owing to the national election, November 4, the sixth annual meeting of the American Society of Oral Surgeons and Exodontists will be held, November 6-8, at Dallas, Texas. This meeting will be held in the Adolphus Hotel Roof Garden.

Members desiring detailed information regarding local arrangements will please write

A. L. FREW, *Chairman*,
Local Arrangements Committee,
4105 Live Oak Street, Dallas.

CREIGHTON DENTAL ALUMNI ASSOCIATION

The annual clinic and home-coming of the Creighton Dental Alumni Association will be held in Omaha at the Creighton Dental College, Oct. 23-25, 1924.

O. A. RUNYON, *President,*
806 City National Bank Bldg.,
Omaha, Nebr.

W. E. STOFT, *Secretary,*
501 City National Bank Bldg.,
Omaha, Nebr.

AMERICAN DENTAL ASSISTANTS' ASSOCIATION ORGANIZATION COMMITTEE

To Dental Assistants' Societies:

A national association for dental assistants is to be organized at Dallas during the meeting of the American Dental Association, Nov. 10-14, 1924. It is proposed to follow as closely as possible the plan and ideal of the American Dental Association. For the purpose of organization, we urge that every society for dental assistants send a properly accredited representative to Dallas. In the event of your society not being able to send a delegate, will you not join in the organization by sending to the organizing committee necessary credentials to act for you? These credentials should be authorized by motion or resolution adopted by each society and should include a copy of the motion or resolution, attested by the president and secretary. We earnestly solicit your active cooperation in helping to make this movement a success, and will appreciate a prompt reply.

JULIETTE A. SOUTHARD, *Chairman,*
174 West Ninety-Sixth Street,
New York City.

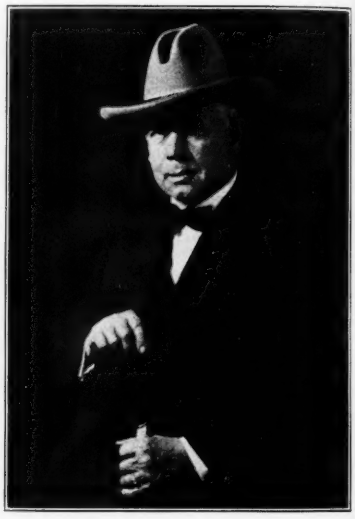
Jessie C. Ellsworth, Chicago, Ill.
Merle Cotter, Des Moines, Iowa
Ida L. Dixon, Peoria, Ill.
Anna Sykora, New York City

CORRECTION

In Dr. William H. Leak's paper, "Operative Care of Children's Teeth," in the August, 1924, issue of THE JOURNAL, on page 738, second column, third paragraph, the author inadvertently misquoted Dr. Thaddeus P. Hyatt, employing the work "sulci" in place of "fissures," in referring to the filling of first molars.

CROWNED

As an evidence of our respect, appreciation and confidence, the members of the dental profession of Ft. Worth, Dallas and neighboring cities, at a banquet given in their honor, crowned Drs. William A. Giffen, President and Otto U. King, Secretary of the American Dental Association, with Texas hats. Their visit was for the purpose of perfecting plans



DR. WILLIAM A. GIFFEN
President, American Dental Association

for the A. D. A. meeting at Dallas, which will be held Nov. 10-14, 1924.

This style of hat will be worn by the members of Texas during the convention that they may be readily identified by our visitors. When you see a man with one of these hats on his head, call on him for anything within reason, and I believe you'll get it, for its firmly fixed in his mind that you are his guest.

J. J. SIMMONS, *Chairman,*
Committee on Publicity.

THE DENTAL DIRECTORY

The publishers of Polk's Dental Register advise us that the replies to 65,000 questionnaires mailed by them (presumably reaching every dentist in the United States and Canada) are not as yet sufficient to assure that completeness and accuracy which they

are determined to attain. At the time of reporting to us only slightly in excess of 25 per cent of the questionnaires had been returned The failure to send in *your* name may indicate the presence of only a small number of dentists in your city or town, and thus mislead those who desire to change location or who are establishing themselves in practice, to select your city or town, which may already have all the dentists it requires.

With the vast number of changes in location, it is impossible to compile a complete list of dentists, without *your* personal cooperation. Many seem to think that because their address is the same now as it was in the 1917 edition of the Register it is not necessary to reply to the questionnaire. This is a grave error. Unless *you* will reply or send in *your* name, it must be assumed that you are no longer in practice.

We desire to call your earnest attention to this important matter. It takes but a few moments to send in your name. Do it now. The members of the profession should realize that an accurate dental directory is an urgent requirement, and that its completeness depends on each individual dentist. The publishers are sparing no expense in time or money. They have secured every name from every possible source. But many of the letters are returned endorsed "not there." "moved," "left no address," "not known" "not found," etc. If you have not sent in your questionnaire, please send it at once. If you have not received one, please send your name and address to the publishers (R. L. Polk & Co., 536 S. Clark Street, Chicago) without delay.

NATIONAL DEFENSE

On Defense Day, the medical profession gave splendid evidence of their support of the National Defense policy.

Officers of the medical, dental and veterinary sections of the Officers' Reserve Corps, and members of the professions not so enrolled, responded to the call in a most gratifying manner, and contributed materially to the success of the Nation's test of its citizens' availability for the protection of the country in emergency.

I desire to express my sincere appreciation of the continued evidence of support which the medical, dental, and veterinary professions are giving to the War Department in the effort to develop adequate medical, dental and veterinary service for the Army.

The obligation for the organization in peace of the units of the Medical Department is appropriately placed upon the medical, dental and veterinary professions of the country. Supervision of this organization as the military representative of these professions is one of the outstanding obligations of my office.

Numerically, the Medical Department sections of the Officers' Reserve Corps are inadequate for the War Department plan. Very definite progress has been made in the development of units of the Medical Department, but the organization is far from the perfect machine which the achievements of the medical, dental and veterinary professions should warrant.

Efficient organization cannot be effected without a Medical Department reserve of 20,000 medical, 5,000 dental, and 2,000 veterinary officers. Only 50 per cent of this enrolment has been attained.

I cannot too strongly urge the necessity for completion of the medical program at an early date, and it is my sincere hope that the dental societies will present to their membership, and the officers of the Reserve Corps to their colleagues, the importance of enrolment in the Reserve.

Further, our organization plans are imperfect, and I desire that officers of the Reserve Corps give the War Department the advantage of constructive criticism which will aid the harmonious and efficient development of medical units which will serve the Army efficiently and to the credit of the professions.

M. W. IRELAND, *Surgeon General*
U. S. Army.

TRANSPORTATION TO THE DALLAS MEETING

An Identification Certificate will be mailed to each member of the Association in ample time for the meeting. When these certificates are properly filled out and presented to the local agent, members and dependent members of their families may purchase round-trip tickets at one and one-half fare.

The selling dates on the Identification Certificate tickets have been revised as follows:

In the territory of the Southwestern and Southeastern Passenger Associations, the selling dates are November 4-12 inclusive, with return limit November 20.

In the territory of the Central Passenger Association, the selling dates are November 5-11 inclusive, with return limit November 20.

In the territory of the Trunk Lines and the New England Passenger Associations, the selling dates are November 4-10 inclusive, with return limit November 20.

In the territory of the Western Passenger Association, the selling dates are November 4-12 inclusive, with return limit November 20.

In the Transcontinental territory, the selling

dates are November 1-10 inclusive, with return limit November 22.

Members are urged to consult their local ticket agents in advance.

In the Canadian Passenger Association, Eastern Lines, territory, the selling dates are November 4-10 inclusive, with return limit November 20. Identification Certificates may be obtained through the Chairman of the Transportation Committee, D. C. Bacon, 31 North State Street, Chicago, Ill.

Special Train

Arrangements have been made for a special train from Chicago, St. Louis, Kansas City and Memphis to Dallas, Texas. This train will carry combination baggage and smoking car and all steel drawing room and compartment cars, as well as a compartment observation sleeper. Through cars for special groups will be attached to the special train.

Schedule of Special Train

Lv. Chicago	3:00 p.m.	Nov. 7th,	I.C.R.R.
Ar. St. Louis	10:00 p.m.	Nov. 7th,	I.C.R.R.
Lv. St. Louis	10:30 p.m.	Nov. 7th,	Mo. Pac.
Ar. Little Rock	8:00 a.m.	Nov. 8th,	Mo. Pac.
Lv. Memphis	11:30 p.m.	Nov. 7th,	Mo. Pac.
Ar. Little Rock	3:55 a.m.	Nov. 8th,	Mo. Pac.
Lv. Kansas City	4:00 p.m.	Nov. 7th,	Mo. Pac.
Ar. Little Rock	7:25 a.m.	Nov. 8th,	Mo. Pac.
Lv. Little Rock	10:00 a.m.	Nov. 8th,	Mo. Pac.
Ar. Hot Springs	12:00 noon	Nov. 8th,	Mo. Pac.
Lv. Hot Springs	9:30 p.m.	Nov. 8th,	Mo. Pac.
Ar. Dallas	8:00 a.m.	Nov. 9th,	Tex.&Pac.

Saturday, November 8, will be devoted to sightseeing in Little Rock and Hot Springs, the train leaving the latter place that night and arriving in Dallas on Sunday morning at 8 o'clock.

Round-Trip Railroad Fares

Chicago	$ 51.54
Detroit, via Chicago or St. Louis	62.69
Grand Rapids, via Chicago or St. Louis	61.49
Milwaukee, via Chicago	56.13
Minneapolis-St. Paul, via Chicago	67.16
via St. Louis	56.81
Philadelphia, via Chicago or St. Louis	82.98
Washington, D. C., via Chicago	82.98
via B. & O. via St. Louis	75.63
via Penna. R. R. via St. Louis	77.79
Cleveland, via Chicago or St. Louis	64.70
Boston, Mass., via Chicago or St. Louis	98.69
New York, via Chicago or St. Louis	87.84
Toledo, via Chicago or St. Louis	59.93
Pittsburgh, via Chicago or St. Louis	69.06
Cincinnati, via St. Louis	52.28
Louisville, via St. Louis	45.83
Nashville, via Memphis	38.15
St. Louis	36.05
Memphis	25.28
Kansas City, via Little Rock	40.14
Omaha, via Kansas City and Little Rock	50.90
Seattle, Wash.	126.39
Portland, Ore.	119.30
San Francisco, Calif.	94.94
Los Angeles, Calif.	78.98
San Diego, Calif.	78.98

Proportionate fares from all other territory; Pullman fares additional.

Above rates do not include round trip rate of $2.00 Benton, Ark. (on main line) to Hot Springs and return.

Pullman Fares

	Lower berth	Upper berth	Compartment	D. R.
Chicago	$11.75	$9.40	$33.50	$41.50
St. Louis	9.50	7.60	26.75	34.00
Memphis	7.25	5.80	20.75	26.00
Kansas City	7.63	6.10	21.50	27.50

Water and Rail Route

From New York to Galveston via Mallory lines, sailings are on Wednesday at noon. The fare including berth and meals is $63. The railroad fare from Galveston to New York via Dallas is $63.77. The trip from New York to Galveston requires six days.

From New York to New Orleans via Southern Pacific lines, sailings are Saturday noon, with arrival in New Orleans the following Friday. The fare from New York to New Orleans including berth and meals is $60. The railroad fare from New Orleans to New York via Dallas is $78.88.

Those traveling via Chicago or starting from that point will make Pullman reservations through

W. G. Ferstel, District Passenger Agent, Illinois Central Railroad, 208 S. La Salle St., Chicago, Ill.

J. J. McQueen, General Agent, Passenger Department, Missouri Pacific Railroad, 714 Standard Trust Bldg., Chicago, Ill.

Those traveling via St. Louis or starting from that city make reservations through

J. M. Griffin, Division Passenger Agent, Missouri Pacific Railroad, 1650 Railway Exchange Bldg., St. Louis, Mo.

Those traveling via Memphis or starting from that city make reservations through

T. D. Moss, Division Passenger Agent, Missouri Pacific Railroad, 270 Shrine Bldg., Memphis, Tenn.

Those traveling via Kansas City or starting from that city make reservations through

W. H. Donny, Assistant General Passenger Agent, Missouri Pacific Railroad, Railway Exchange Bldg., Kansas City, Mo.

For further particulars concerning the special train please take up with any Illinois Central or Missouri Pacific representative listed above.

The Trip to Old Mexico

In the September issue of *The Journal*, we published a tentative itinerary for the Old Mexico tour. On the advice of the National Railways of Mexico, we have decided to return by a diverse route, via Guadalajara. Irapuato, Aguascalientes and San Luis Potosi, which will give us a much more comprehensive view of the country than will going and returning via the same route.

Following is the schedule as corrected:

Lv. Dallas	10:00 p. m.	C. T.	Southern Pacific Lines	Friday, Nov. 14
Ar. San Antonio	7:45 a. m.	C. T.	Southern Pacific Lines	Saturday, Nov. 15
Lv. San Antonio	9:30 a. m.	C. T.	I & G N Ry.	Saturday, Nov. 15
Ar. Laredo, Texas	3:45 p. m.	C. T.	I & G N Ry.	Saturday, Nov. 15
Lv. Laredo, Mexico	7:45 p. m.	M. T.	National Rys. of Mexico	Saturday, Nov. 15
Ar. Monterrey	2:05 a. m.	M. T.	National Rys. of Mexico	Sunday, Nov. 16
Lv. Monterrey	3:10 p. m.	M. T.	National Rys. of Mexico	Sunday, Nov. 16
Ar. Mexico City	8:05 p. m.	M. T.	National Rys. of Mexico	Monday, Nov. 17
Lv. Mexico City	7:00 a. m.	M. T.	National Rys. of Mexico	Wednesday, Nov. 19
Ar. Cuernavaca	11:37 a. m.	M. T.	National Rys. of Mexico	Wednesday, Nov. 19
Lv. Cuernavaca	1:01 p. m.	M. T.	National Rys. of Mexico	Thursday, Nov. 20
Ar. Mexico City	6:45 p. m.	M. T.	National Rys. of Mexico	Thursday, Nov. 20
Lv. Mexico City	7:50 a. m.	M. T.	National Rys. of Mexico	Saturday, Nov. 22
Ar. Pyramides	9:33 a. m.	M. T.	National Rys. of Mexico	Saturday, Nov. 22
Lv. Pyramides	4:41 p. m.	M. T.	National Rys. of Mexico	Saturday, Nov. 22
Ar. Mexico City	6:20 p. m.	M. T.	National Rys. of Mexico	Saturday, Nov. 22
Lv. Mexico City	5:20 p. m.	M. T.	National Rys. of Mexico	Sunday, Nov. 23
Ar. Guadalajara	8:15 a. m.	M. T.	National Rys. of Mexico	Monday, Nov. 24
Lv. Guadalajara	4:25 p. m.	M. T.	National Rys. of Mexico	Monday, Nov. 24
Ar. Irapuato	10:35 p. m.	M. T.	National Rys. of Mexico	Monday, Nov. 24
Lv. Irapuato	2:30 a. m.	M. T.	National Rys. of Mexico	Tuesday, Nov. 25
Ar. Aguascalientes	8:30 a. m.	M. T.	National Rys. of Mexico	Tuesday, Nov. 25
Lv. Aguascalientes	9:15 a. m.	M. T.	National Rys. of Mexico	Tuesday, Nov. 25
Ar. San Luis Potosi	4:10 p. m.	M. T.	National Rys. of Mexico	Tuesday, Nov. 25
Lv. San Luis Potosi	8:30 p. m.	M. T.	National Rys. of Mexico	Tuesday, Nov. 25
Ar. Nuevo Laredo	6:00 p. m.	C. T.	National Rys. of Mexico	Wednesday, Nov. 26
Lv. Laredo, Texas	11:00 p. m.	C. T.	Inte'l Great & N. Ry.	Wednesday, Nov. 26
Ar. San Antonio	6:30 a. m.	C. T.	Inte'l Great & N. Ry.	Thursday, Nov. 27

Because of the six-day return limit on the Identification Certificate tickets, it will be necessary for those going to Mexico to purchase Winter Tourist tickets, taking a stopover for the Dallas meeting.. This will make the trip available for all members of the A. D. A. and for their friends as well.

Winter Tourist Fares Effective October 1, 1924, Good With Final Return Limit to May 31, 1925

From	To Mexico City and Return	U. S. Currency
New York		$179.06
Philadelphia		173.22
Chicago		132.70
Kansas City		107.35
St. Louis		116.00
Memphis		103.95
Detroit		147.00
Cleveland		150.38
Cincinnati		136.35
Indianapolis		131.97
St. Paul		139.20
Minneapolis		139.20
Toledo		142.86
New Orleans		96.65
Denver		120.67
Washington		164.40
Oklahoma City		93.61
Baltimore		167.00
Pittsburgh		156.04

Those wishing an attractive booklet on Mexico can obtain same through the Chairman of the Transportation Committee.

Make your reservations early, advising space desired, whether drawing-room, compartment, section or lower.

D. C. Bacon, *Chairman*,
Transportation Committee,
31 North State Street, Chicago, Illinois.

Street Car or Taxicab

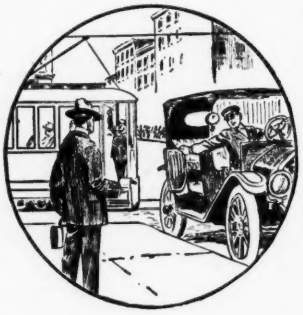
Which Is Economical?

By ERNEST V. MADISON

John Jones wanted to reach the other end of the city. He found the street cars stopped because a derailed car had blocked the tracks. He called a taxi. To reach his destination it cost him $1.90 instead of the 5-cent street car fare.

The manufacturer of *Dental Materials and Supplies* wants to reach you, the buyer. He can reach you through either of two ways—by advertising or by sending a man to see you.

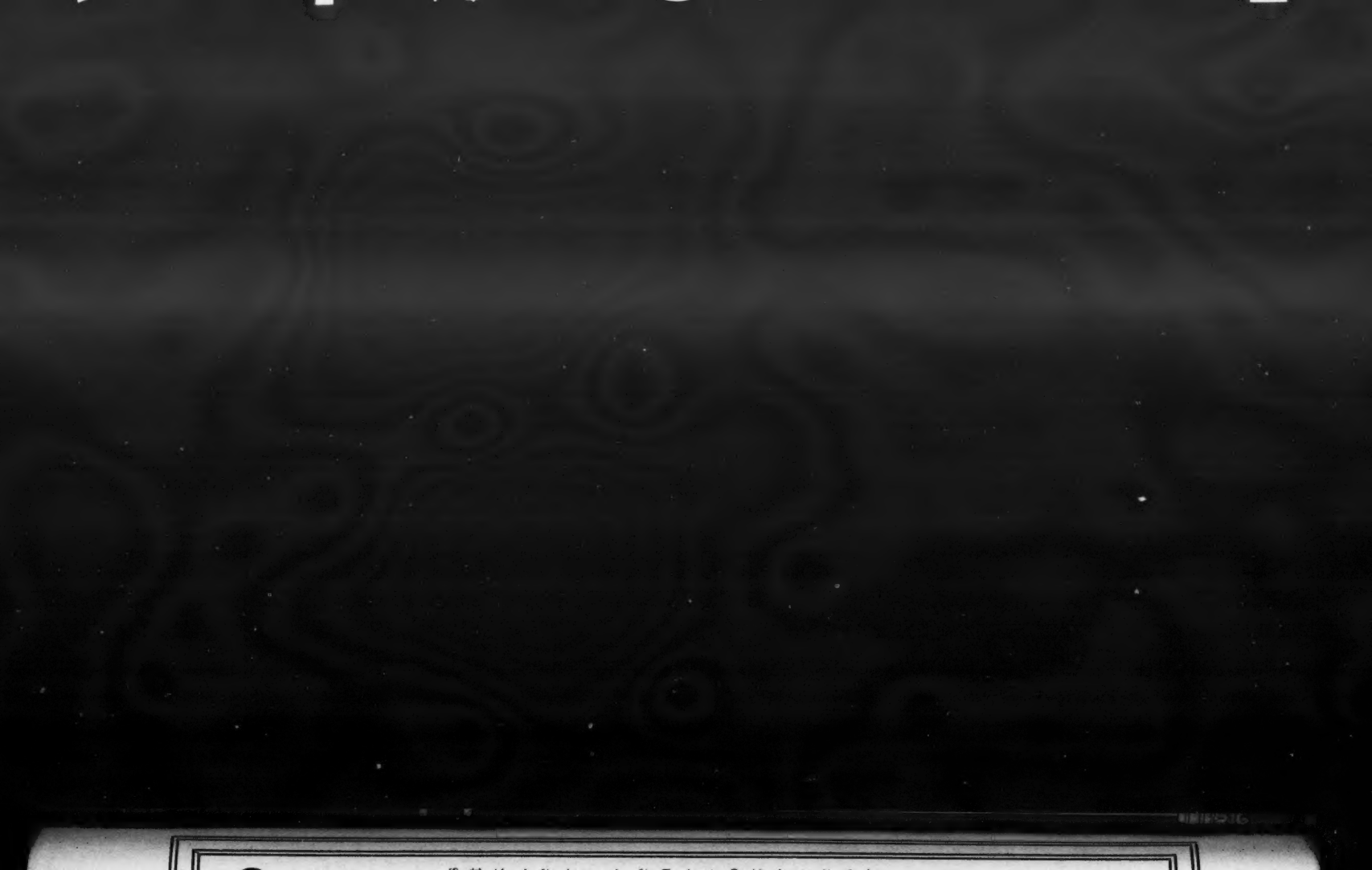
In former days, the manufacturer had to send out his salesmen to tell the dealers, who told their clerks, and their clerks told the ultimate buyers. This was the taxicab method of *introducing and advertising* a product. A little more exclusive but very expensive.



Now printed advertising does this educational work.

The advertisement of the manufacturer in *The Journal of the American Dental Association* quickly reaches a large audience of *Dentists*—so many that it would require years for a force of salesmen to visit and tell his story to them. His jobbers or distributors need fewer salesmen because of this advertising. It eliminates a great deal of personal educational work on behalf of their merchandise. Naturally, this economy lessens the selling cost, *which is always included in a selling price.*

Advertising is the *street-car method.* It is the cheapest medium by which the manufacturer can convey his message to you. The street car's fare is moderate because it carries fifty people where the taxicab's capacity is four or five people.

Advertising will reach thousands where the personal method will reach but one person in an equal time.

Think a minute! Shouldn't we read the advertisements in *The Journal of the American Dental Association* because they are working to lower the selling costs of the merchandise we buy?